40MHz READOUT OSCILLOSCOPE

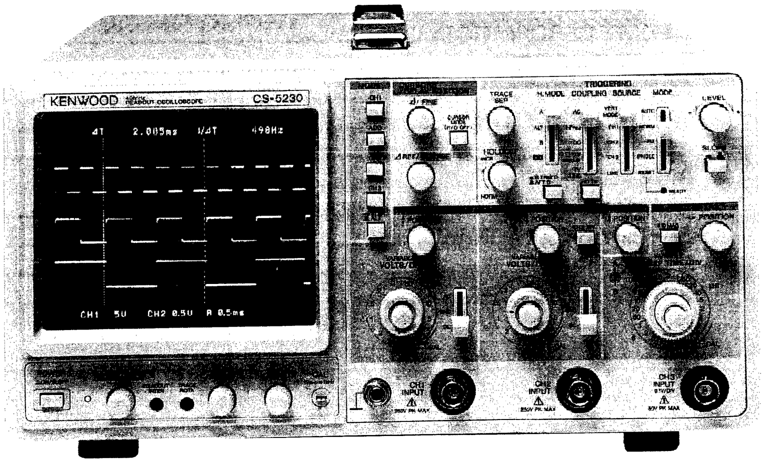
CS-5230

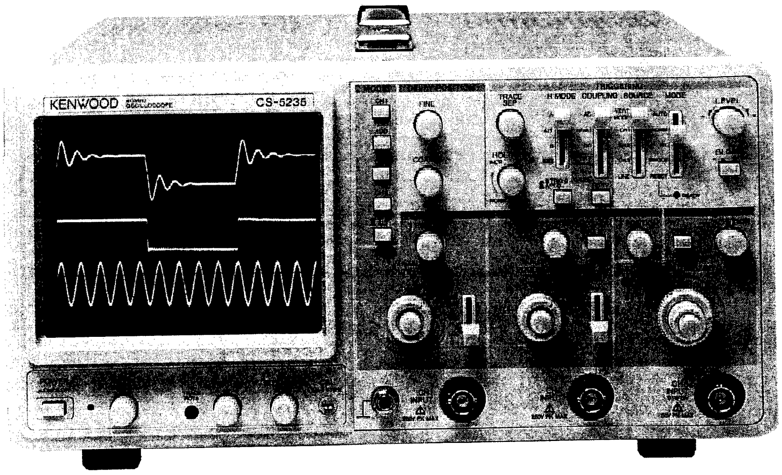
40MHz OSCILLOSCOPE

CS-5235

SERVICE MANUAL

KENWOOD CORPORATION


KENWOOD
40MHz READOUT OSCILLOSCOPE
CS-5230
ΔT 2.005ms 1/ΔT 498Hz
CH1 5V CH2 0.5V A 0.5ms
TRIGGERING
TRACE SEP
H.MODE
COUPLING
SOURCE
MODE
LEVEL
CH1 INPUT
CH2 INPUT
CH3 INPUT


KENWOOD
40MHz OSCILLOSCOPE
CS-5235
TRIGGERING
TRACE SEP
H.MODE
COUPLING
SOURCE
MODE
LEVEL
FINE

WARNING

The following instructions are for use by qualified personnel only. To avoid electric shock, do not perform any servicing other than contained in the operating instructions unless you are qualified to do so.

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SPECIFICATIONS

CRT		
Type		150 mm rectangular tube with an integral graticule
Acceleration voltage		Approx. 12 kV
Effective area		8 × 10 divisions (1 division = 10 mm)
VERTICAL AXIS (COMMON TO CHANNELS 1 AND 2)		
Sensitivity (+10 to +35℃)		1 mV, 2 mV/div : ±5%, 5 mV to 5 V/div: ±3%
Attenuation		1-2-5 steps, 12 ranges, fine control between ranges
Input impedance		1 MΩ ± 2%, approx. 25 pF
Frequency response (-3 dB) (+10 to +35℃)	5mV to 5V/div	DC : DC to 40 MHz AC : 5Hz to 40 MHz
	1mV to 2mV/div	DC: DC to 20MHz, AC: 5Hz to 20MHz
Rise time (+10 to +35℃)	5mV to 5V/div	Approx. 8.8 ns
	1mV to 2mV/div	Approx. 17.5 ns
Signal delay time		The leading edge may be checked using a square wave of the rise time less than that of this model.
Crosstalk		-40 dB or less (at 1 kHz)
⚠Maximum input voltage		500 Vp-p or 250 V (DC+AC peak, 1 kHz or less)
VERTICAL AXIS (CH3)		
Sensitivity (+10 to +35℃)		0.1 V/div: ±3%
Input impedance		1MΩ ± 2%, approx. 25 pF
Frequency response (-3 dB) (+10 to +35℃)		DC to 40 MHz
Rise time (+10 to +35℃)		Approx. 8.8 ns
Signal delay time		The leading edge may be checked using a square wave of the rise time less than that of this model.
⚠Maximum input voltage		100 Vp-p or 50 V (DC+AC peak, 1 kHz or less)
Operation		Single trace: CH1, CH2, CH3 or ADD single trace operation Multi-trace : 2 to 4 traces of CH1, CH2, CH3 and ADD
		ALT/CHOP: Display by selecting ALT and CHOP ADD : Composite waveform of CH1 and CH2 signals are displayed.

SPECIFICATIONS

Chop frequency		Approx. 250 kHz (in multi-trace operation)
Channel polarity		Normal or inverted, CH2 only inverted
Horizontal axis (CH2, except for ×10 MAG operation)		
Sensitivity (+10 to +35℃)		Same as vertical axis (CH2)
Input impedance		Same as vertical axis (CH2)
Frequency response (−3 dB) (+10 to +35℃)		DC: DC to 1 MHz, AC: 5 Hz to 1 MHz
X-Y phase difference		3° or less at 100 kHz
Operation mode		X-Y mode is selected with H. MODE CH1: Y-axis, CH2: X-axis
⚠Maximum input voltage		Same as vertical axis (CH2)
SWEEP		
Sweep types		A : A sweep ALT : Alternate A sweep and B sweep B : B sweep X-Y : X-Y oscilloscope operation
Sweep time (+10 to +35℃)	A sweep	0.5s to 0.1μs/div ±3% 1-2-5 steps, 21 ranges, fine adjustment between ranges
	B sweep	50ms to 0.1μs/div ±3% 1-2-5 steps, 18 ranges, fine adjustment betwen ranges
Sweep magnified operation (+10 to +35℃)		×10 ± 5% (±8% for over 0.5 ns/div)
Linearity (+10 to +35℃)		±3% (±5% in ×10 MAG operation)
HOLDOFF		Continuously variable from A sweep NORM position
Trace separation		B sweep is continuously variable by ±4 divisions or more with respect to A sweep.
Delayed sweep operation		Continuous delay operation (AFTER DELAY) Synchronous delay operation (B TRG'D) : Synchronous with the trigger signal
Delay time		Continuous control by 0.2 to 10 divisions for 0.5 div to maximum speed sweep
Delay time error (+10 to +35℃)		[CS－5230] : ±(3% of set value+1% of full scale)+(0 to 300 ns) [CS－5235] : Reading on CRT ±4% (0 to 300 ns)
Delay jitter		10000 : 1 of a value 10 times as high as A sweep setting

SPECIFICATIONS

TRIGGERING	
Trigger modes	AUTO : Automatic free running with no signal NORM : Triggered sweep FIX : Sweep at triggering point set to center of signal amplitude SINGLE: Single sweep mode RESET : Restarting single sweep operation
Trigger signal sources	VERT: Input signal selected for V. mode CH1 : Channel 1 input signal CH2 : Channel 2 input signal CH3 : Channel 3 input signal LINE: Commercial power line
Trigger coupling (For trigger sensitivity, see the table below.)	AC : AC coupling from 10 Hz HFrej : Low-pass filter coupling up to 30 kHz DC : DC coupling TV FRAME: Composite video signal, vertical synchronization separation TV LINE : Composite video signal, horizontal synchronization separation

Trigger sensitivity (+10 to +35℃)

MODE	COUPLING	Signal frequency	Sensitivity (Amplitude)	
			NORM	FIX *
NORM	AC	10Hz to 20MHz	1div	1.5div
		20M to 40MHz	1.5div	2div
	HFrej	10Hz to 30kHz	1div	1.5div
		over 30kHz	>min.	>min.
	DC	DC to 20MHz	1div	1.5div
		20M to 40MHz	1.5div	2div
	TV-F, -L	Composite video signal	1.5div	
	HDTV	HDTV video signal	1.5div	

AUTO : Same as above specifications for above 40Hz.

(The table shows the sensitivities in terms of the amplitude displayed on the CRT.)
(>min. for the HFrej sensitivity shows that the amplitude necessary for synchronization increases.)

FIX * : Same as above specifications for above 50Hz.

SPECIFICATIONS

CALIBRATION SIGNAL : POSITIVE SQUARE WAVE, 1 Vp-p ±3%, APPROX. 1 kHz		
INTENSITY MODULATION		
Input voltage		Darkens at TTL level (+5 V).
Input impedance		Approx. 10 kΩ
Frequency response (+10 to +35℃)		DC to 3.5 MHz
⚠Maximum input voltage		100 Vp-p or 50V (DC+AC peak)
CH1 OUTPUT SIGNAL (WITH 50 Ω LOAD)		
Output voltage		Approx. 50 mVp-p/div
Output impedance		Approx. 50 Ω
Frequency response (-3dB)	1, 2 mV	100 Hz to 20 MHz
	5 mV to	100 Hz to 40 MHz
TRACE ROTATION : TRACE ANGLE IS ADJUSTABLE WITH A SEMI-FIXED CONTROL ON PANEL.		
POWER SUPPLY		
Voltage		100/120/220/230 VAC ± 10 %
Frequency		50 Hz or 60 Hz
Power consumption		Approx. 43 W, 39 W Approx. 52VA, 49VA
DIMENSIONS AND WEIGHT (VALUES ENCLOSED IN PARENTHESES INCLUDE PROJECTIONS.)		
Width		300 mm (300 mm)
Height		150 mm (172 mm)
Depth		400 mm (469 mm)
Weight		Aprrox. 8.7 kg
OPERATING TEMPERATURE AND HUMIDITY		
Operating temperature and humidity		0 to 40℃, 85% RH or less
Storage temperature and humidity		−20 to 70℃, 85% RH or less
ACCESSORIES		
Probe		PC-33 : 10 MΩ ±1%, 22 pF±10%, 10 : 1 [CS-5230] PC-35 : 10 MΩ ±1%, 19.5 pF±10%, 10 : 1 [CS-5235]
		2 each
Instruction manual		1 copy
Adjusting screwdriver		1
Power cord		1
Replacement fuse		1 A×2 (for 100 V area) 630 mA×2 (for 200 V area)

SPECIFICATIONS

[The specifications shown below do not apply to the CS-5235.]

READOUT	
Set values	CH1 and CH2 scale factors (with probe detection), CH3 scale factor (0.1 V/div fixed, with no probe detection), V-UNCAL, ADD, INV, A/B sweep scale factors (MAG-converted), sweep - UNCAL, DELAY TIME, TRIG'D, X-Y
Cursor modes (Between ΔREF and Δ cursors) In X-Y mode, only ΔV1 may be set.	ΔV1 :Displayed in voltage with conversion according to CH1 scale factor ΔV2 :Displayed in voltage with conversion according to CH2 scale factor ΔV3 :Displayed in voltage with conversion according to CH3 0.1 V/div ΔT :Displayed in time with conversion according to A sweep scale factor 1/ΔT:Displayed in frequency with conversion according to A sweep scale factor
In V, H-VARI or UNCAL mode	RATIO:Voltage ratio and time ratio are displayed, with 5 divisions on the CRT as 100%. PHASE:Phase difference is displayed, with 5 divisions on the CRT as 360°.
Cursor measurement	Resolution : 10 bits Measuring error: ±4% Measuring range: ±3.6 divisions or more vertically from CRT center. ±4.6 divisions or more horizontally from CRT center.

■The specifications shown above are subject to change without notice.

SAFETY

SAFETY

Before connecting the instrument to a power source, carefully read the following information, then verify that the proper power cord is used and the proper line fuse is installed for power source. The specified voltage is shown at the fuse holder of the AC inlet. If the power cord is not applied for specified voltage, there is always a certain amount of danger from electric shock.

Line voltage

This instrument operates using ac-power input voltages that 100/120/220/230 V at frequencies from 50 Hz to 60 Hz.

Power cord

The ground wire of the 3-wire ac power plug places the chassis and housing of the oscilloscope at earth ground. Do not attempt to defeat the ground wire connection or float the oscilloscope; to do so may pose a great safety hazard. The appropriate power cord is supplied by an option that is specified when the instrument is ordered.
The optional power cords are shown as follows in Fig. 1.

Line fuse

The fuse holder is located on the rear panel and contains the line fuse. Verify that the proper fuse is installed by replacing the line fuse.

Voltage conversion

This oscilloscope may be operated from either a 100 V to 230 V, 50/60 Hz power source. Use the following procedure to change from 100 to 230 volt operation or vice versa.

1. Remove the fuse holder.
2. Replace fuse F 1 with a fuse of appropriate value, 1 amp for 100 VAC to 120 VAC operation. 630 m amp for 220 VAC to 230 VAC operation.
3. Reinsert it for appropriate voltage range.
4. When performing the reinsertion of fuse holder for the voltage conversion, the appropriate power cord should be used. (See Fig.1.)

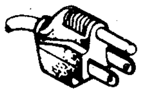
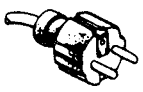
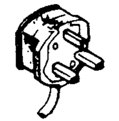
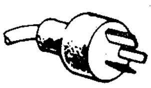
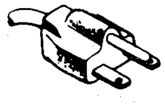
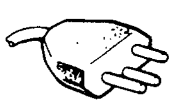
Plug configuration	Power cord and plug type	Factory installed instrument fuse	Line cord plug fuse	Parts No. for power cord
	North American 120 volt/60 Hz Rated 15 amp (12 amp max; NEC)	1 A, 250 V Fast blow 6 × 30 mm	None	E30-1951-05
	Universal Europe 220 volt/50 Hz Rated 16 amp	North Europe 630 mA, 250 V Slow blow 5 × 20 mm Other Europe 630 mA, 250 V Slow blow 6 × 30 mm	None	E30-1952-05
	U.K. 240 volt/50 Hz Rated 13 amp	630 mA, 250 V Slow blow 6 × 30 mm	None	E30-1947-05
	Australian 240 volt/50 Hz Rated 10 amp	630 mA, 250 V Slow blow 6 × 30 mm	None	E30-1821-15
	North American 240 volt/60 Hz Rated 15 amp (12 amp max; NEC)	630 mA, 250 V Slow blow 6 × 30 mm	None	–
	Switzerland 240 volt/50 Hz Rated 10 amp	630 mA, 250 V Slow blow 6 × 30 mm	None	–

Fig. 1 Power Input Voltage Configuration

CIRCUIT DESCRIPTION

VERTICAL PREAMPLIFIER UNIT

CH1, CH2

Each of the CH1 and CH2 inputs passes through an AC/DC/GND switch and enters the 1st attenuator (1/1, 1/10, 1/100).
The 1st attenuator is used in combination with the 2nd attenuator (1/1, 1/2, 1/4, 1/10) and the 5-fold function of the 2nd amplifier, to switch the 12 vertical ranges.
The head amp is composed of Q102 and U101 (Q202 and U201) and is a 1/1 buffer amp with an input impedance of 1 megohms and used for conversion of impedance. Q102 (Q202) is the source-follower. This head amp is installed between the 1st and 2nd attenuators.
Starting from the 2nd amp, this unit takes the differential amplifier configuration. The functions of U102 (U202) include the variation and inversion functions. The variation function allows to vary the gain continuously according to the voltage applied to pin 5. The inversion function allows to invert the phase according to the voltages applied to pins 6 and 7. As this function is provided only for CH2, CH1 is fixed. At the CH2 side, switch is done by Q215. Q103 (Q203) is the regulated current supply for U102 (U202).
Q106 and Q107 (Q206 and Q207) form an emitter-grounded amp.
Q108 to Q111 (Q208 to Q211) form the cascode amp of the differential amp. The vertical position can be moved by regulating the current applied to the emitter of Q111 (Q211) based on the panel operation.

CH3

With CH3, the attenuator is fixed. The signal impedance is converted by the buffer amp of source follower Q303 and regulated current supply Q304 and the signal is sent to emitter-follower Q305. Q305 is the signal side input stage of the differential amp.
Emitter-follower Q306 is the input stage of a constant-potential differential amp.
The outputs from Q305 and Q306 are input to the differential type cascode amp formed by Q307, Q308, Q310 and Q311. The current of the cascode amp is determined by regulated current supply Q309. The vertical position can be moved by regulating the current applied to the emitter of Q311 based on the panel operation.

Channel selector, delay line drive

As for the outputs from the position amps of the channels, only the signal of the channel with which the cathodes of CH1 - D104, D105, CH2 - D204, D205, CH3 - D301, D302, D304, D305 are turned "H" by the signals from V-MODE LOGIC is sent through CH1 - D103, D106, CH2 - D203, D206, CH3 - D303, D306 and transmitted to the delay line driver.
Q2 and Q3 form a feedback amp. Q1 lets the excessive bias current flow when CH1 or CH2 is in ADD mode.

Trigger amp, trigger selector

With CH1 (CH2), the differential outputs from U102 (U202) are input to the emitter-followers Q152 and Q153 (Q252 and Q253), where Q153 (Q253) forms a cascode amp with Q114 (Q214).
With CH3, the signal after the buffer amp is sent through the buffer of emitter-follower Q314, feedback amp Q312 an output as current from the collector of emitter-follower Q313.
Only the signal of the channel with which the cathode of CH1 - D108, CH2 - D208, CH3 - D308 is turned "H" by the signal from the trigger controller is sent through CH1 - D107, CH2 - D207, CH3 - D307 and output as current to the Horizontal unit. Q31 the excessive bias current flow when CH1 or CH2 is in ADD mode.

CH1 OUT

The CH1 output is sent from the collector of Q152, through emitter-follower Q51 and output at CH1 OUT of the Final unit.

Trigger controller

The data on the trigger source set on the panel is input to pin 1 of U1 and "H" or "L" is output at pins 4 to 8 according to the set state.
U2 is used to switch between the data from U1 and the CRT display data of each channel from V-MODE LOGIC. If the current mode is not V mode, the former data is selected. If the current mode is V mode, the latter data is selected for use in controlling the trigger selector.
Among CH1 - U2 pin 7, CH2 - U2 pin 9, CH3 - U2 pin 12, the terminal set with the panel is turned "H".

V-MODE LOGIC

U3 and U4 generates a signal synchronized with the display channel select signal from the panel and the end of horizontal sweep, and a signal for controlling the channel selector based on the CHOP signal. (Figure 1)
Q34 cuts off the power supply to U4 only at the instant the channel switch is pressed, in order to prevent malfunction.

Vertical range converter

U401, U403, S102 and S202 output the vertical range, CAL and UNCAL data by turning them into analog values using an opamp for use as the R/O data. (Figures 3, 4)

Horizontal range converter

U402 and S401 output the horizontal range data using an opamp, as analog values for R/O data. (Figure 5)
U404 (for main sweep), U405 (for sub-sweep) and S401 are used to switch the reference voltage for letting the sweep current of the 1-2-5 steps of horizontal sweep flow. (Figure 2)

FINAL UNIT

Final amplifier

The signal sent from the vertical preamp through the delay line is input to the feedback amp of Q1 and Q2. During A ALT B sweep, the variation of the vertical position of sweep B is controlled by the current applied to the base of Q2 based on the panel operation.
Q3, 4, Q105, Q106 and U1 are used to amplify the vertical signal

CIRCUIT DESCRIPTION

and U1, Q105 and Q106 are used to amplify the R/O characters. U1 is used to switch between the vertical signal and R/O signal. Q9-Q12, Q113 and Q114 are cascode-connected for use in driving the CRT.

AC inlet, fuse

An external commercial supply voltage switch and fuse holder are provided.

Line filter

A filter for elimination of common mode noise and normal mode noise is provided.

CH1 OUT

The signal from the vertical preamp is output externally via Q201 and Q202 as a signal with 50-ohm impedance.

HORIZONTAL UNIT

Trigger

The trigger signal supplied from the Vertical unit (X73-2070) is AC/DC coupled and the trigger level is added to it.
The obtained signal is input to the trigger shaping circuit to become a pulse signal.
If FIX is selected, the trigger level is fixed so that it is always around the center of the waveform.
With TV-V, the composite video signal is separated by the V sync separator and input to the trigger shaping circuit.
With TV-H, the composite video signal is separated by the H sync separator and input to the trigger shaping circuit.
HFrej is used to apply a 50 kHz LPF to the trigger signal.
The polarity of the trigger pulse signal can be changed with SLOPE +/-. The output signal is input to the sweep logic circuit.
There is an additional circuit which applies the trigger signal to the sweep logic in case the trigger pulse signal has not been input for a certain period and auto free-run mode has been selected.

Sweep

When the trigger pulse is input to the sweep logic, the sweep gate is activated and the sweep wave is output.
When the sweep wave reaches a certain level, the sweep stop circuit is activated to close the sweep gate and end sweep.
When sweep stop is activated, the hold-off circuit is activated and, in a certain period after it, the sweep logic enters the trigger standby state.
The delayed sweep is performed either as the AFTER DELAY sweep or B TRIG'D sweep.
With the AFTER DELAY sweep, the voltage level of the main sweep wave and the voltage set with DTP are compared and delayed sweep is performed using the result signal as the trigger.
With the B TRIG'D sweep. sweep is triggered by the next trigger signal input after the voltage level of sweep wave have reached the voltage set with DTP.
In case ALT sweep is set, the main sweep and delayed sweep are performed alternately.

Horizontal amp

This circuitry switches between the sweep wave generated in the sweep block and the X signal and add H-POSITION.
After being magnified by 10 times if MAG has been selected, the signal is input to the R/O switch.
Here, the R/O signal is added to the vertical signal and the signal is amplified by the final amp to a high enough voltage level to drive the CRT.

Intensity circuit

The Z signal is generated with the sweep gate of the main sweep and that of the delayed sweep. During ALT sweep, a waveform for increasing the intensity of the delayed sweep section is generated with the main sweep. The voltage set with the INTEN potentiometer is added to the X signal and the voltage set with the R/O INTEN potentiometer is added to the R/O blanking signal and they are input to the high voltage circuit.
The high voltage circuits generates the CRT cathode voltage, G1 voltage and P1 voltage based on the intensity signal and the **FOCUS potentiometer.**
The cathode voltage is controlled always constant by the opamp.
For use with the after-accelerating CRT, the anode voltage is also generated by the high voltage circuit.

Power supply

AC voltages of +14.8 V, -14.8 V, +6 V, -6 V, +67 V and +170 V are input from the transformer, and they are turned into stable DC voltages of respectively +12 V, -12 V, +5 V, +55 V and +140 V, which are supplied to their respective units.

CHOP

To observe signals of multiple channels simultaneously, the vertical amp is switched with the CHOP signal.

PANEL UNIT

This unit sends the potentiometer and switch data from the control panel to other units.
A limiting circuit is provided to prevent the CHIP operation while multi-channel operation is not selected even when the CHOP key is pressed.
The voltage setting of DTP is made by the opamp in the range from 0 to +4 V. The CAL signal is a 1 kHz, 1 Vp-p square wave.
The intensity is controlled by the PWM based on the output from the original oscillator of CAL.

R/O UNIT

The R/O unit (X77-1870-00) accepts the attenuator and sweep data sent from or through the Panel unit and outputs character data to be displayed on the CRT.
It is composed of the controller block (U1, U2, U4 U6, X1), blanking circuit (U5, U14, U15, X2), A/D converter block (U3, U16, U17) and character data output block (U7, U8 U9, U10, U13).
The controller block is composed of the 1-chip CPU (with built-in ROM), RAM, decoder, ALE and oscillator x 1. The 1-chip CPU

CIRCUIT DESCRIPTION

(U1) incorporates a ROM as descried above, and the entire unit is controlled by the software written in this ROM. The 1-chip CPU is operated based on X1 (10 MHz). Before the start of operation, the reset signal is input from U18 when the power is switched on. The 1-chip CPU incorporates 8-bit A/D converters in the output ports, input ports and also internally, and it outputs character data for CRT display based on the data input through the A/D converters.

As for the output port configuration, P40 to P47 and P30 to P33 in the circuit diagram output comparison data for an external 12-bit A/D converter and P34 to P37 output the control data for use in switching the analog data to the external 12-bit A/D converter. As for the input port configuration, P60 to P64 are used to recognize the "H" or "L" level of the push switches on the panel and input the CURSOR MODE, B TRIG'D, CH2 INV and X10 MAG signals. Among them, the CURSOR MODE switch is a non-locking switch so a Schmitt circuit is provided before the signal is input to the port. P50 to P57 are the analog voltage input ports. The input voltage is sent to the internal 8-bit A/D converter, converted into digital data and becomes the CRT display data. The 1-chip CPU has a bus configuration of 8 data bus bits and 16 address bus bits. A the lower 8 bits of the address bus are also used as the data bus bits, IC (ALE circuit IC) U6 is provided for their separation.

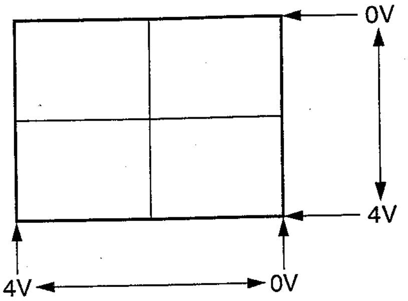
In addition to above, the controller block also incudes a decoder (U4) and memory (U2). The decoder output is supplied to the memory as well as to the X latch CLK input, Y latch CLK input and blanking circuit block which will be described below. The memory functions as the system RAM of the 1-chip CPU and also stored CRT display data. The stored data is some of the data which has originally been prepared in the ROM inside the 1-chip CPU; only the data required for CRT display is stored in this memory.

Next, the blanking circuit block is composed of a 4 MHz oscillator composed of X2 and the inverter (U15), shift register (U14), inverter (U15) and OR (U5). It outputs the Blanking (R/O BLK), request (R/O REQ) and unblanking (R/O UBL) signals. The signals are output at the timing synchronized with the CLK signal from the decoder to X latch (U7) and Y latch (U8) and used to switch the display from waveform to character or from character to waveform and to clear the trace during switching. R/O BLK is used to clear the trace, R/O REQ is used to switch display between characters and traces and R/O UBL is used to illuminate a single dot in the character.

In synchronism with the signal outputs from the blanking circuit block, the character data output block outputs R/O-X (character dot position in Horizontal direction) and R/O-Y (character dot position in Vertical direction). The character data is sent from the memory (U2) described above to the X latch and Y latch, and the position data is sent through the address bus.

These data are latched simultaneously, and the latched data are input to the respective 8-bit D/A converters (U9, U10) to be converted into analog signals. After conversion, the obtained analog signals are input to analog switches U11 and U12, output from opamp U13 as signals with 0 to 4 V amplitudes, and sent respectively to the final amp.

The analog switches are supplied with the cursor voltages, which are used to determine the CRT screen position in case the cursor output is required. The relationship between these voltages and the CRT screen display is as shown in the following diagram.



In addition, there is an external 12-bit A/D converter for use as the means to input character data. This converts the cursor voltages , sweep time voltage, DTP voltage, etc., which require a certain resolution into digital data. The A/D converter is formed with an analog switch (U17), comparator (U3) and D/A converter (U16) for A/D conversion with the successive comparison method.

CIRCUIT DESCRIPTION

V-MODE LOGIC

When CH1 is selected with V-MODE

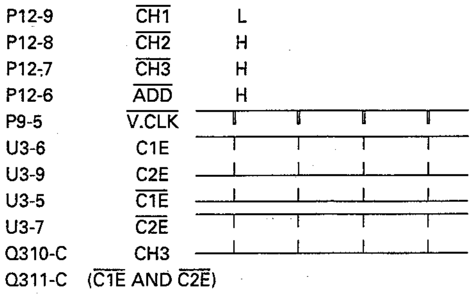

P12-9 $\overline{\text{CH1}}$ L
P12-8 $\overline{\text{CH2}}$ H
P12-7 $\overline{\text{CH3}}$ H
P12-6 $\overline{\text{ADD}}$ H
P9-5 $\overline{\text{V.CLK}}$
U3-6 C1E
U3-9 C2E
U3-5 $\overline{\text{C1E}}$
U3-7 $\overline{\text{C2E}}$
Q310-C CH3
Q311-C ($\overline{\text{C1E}}$ AND $\overline{\text{C2E}}$)

Fig. 1-a

When CH2 is selected with V-MODE

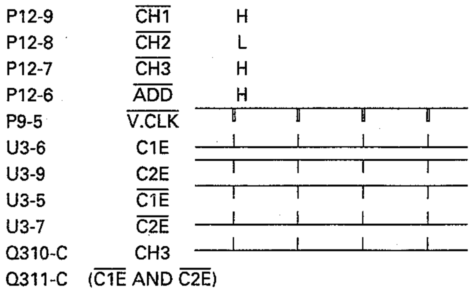

P12-9 $\overline{\text{CH1}}$ H
P12-8 $\overline{\text{CH2}}$ L
P12-7 $\overline{\text{CH3}}$ H
P12-6 $\overline{\text{ADD}}$ H
P9-5 $\overline{\text{V.CLK}}$
U3-6 C1E
U3-9 C2E
U3-5 $\overline{\text{C1E}}$
U3-7 $\overline{\text{C2E}}$
Q310-C CH3
Q311-C ($\overline{\text{C1E}}$ AND $\overline{\text{C2E}}$)

Fig. 1-b

When CH3 is selected with V-MODE

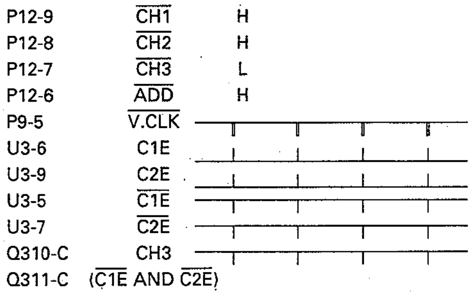

P12-9 $\overline{\text{CH1}}$ H
P12-8 $\overline{\text{CH2}}$ H
P12-7 $\overline{\text{CH3}}$ L
P12-6 $\overline{\text{ADD}}$ H
P9-5 $\overline{\text{V.CLK}}$
U3-6 C1E
U3-9 C2E
U3-5 $\overline{\text{C1E}}$
U3-7 $\overline{\text{C2E}}$
Q310-C CH3
Q311-C ($\overline{\text{C1E}}$ AND $\overline{\text{C2E}}$)

Fig. 1-c

CIRCUIT DESCRIPTION

When ADD is selected with V-MODE

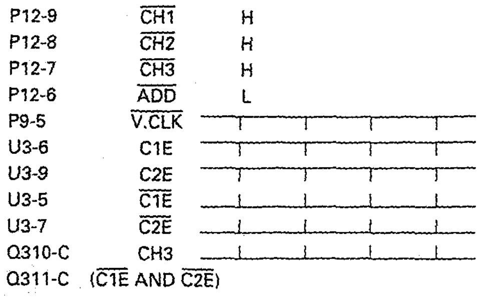

P12-9 $\overline{CH1}$ H
P12-8 $\overline{CH2}$ H
P12-7 $\overline{CH3}$ H
P12-6 $\overline{ADD}$ L
P9-5 $\overline{V.CLK}$
U3-6 C1E
U3-9 C2E
U3-5 $\overline{C1E}$
U3-7 $\overline{C2E}$
Q310-C CH3
Q311-C ($\overline{C1E}$ AND $\overline{C2E}$)

Fig. 1-d

There are 16 combinations obtained from the 4 states, and it is abnormal if all of these are "H".
When more than one combination are used, the state is switched at the negative going of $\overline{V.CLK}$ in the order shown below:

→ CH1 → CH3 → CH2 → ADD ↲

WEEP CODE S301	a	A SWEEP				B SWEEP					VOLTAGE RANGE (V)	VOLTAGE (V)	VOLTAGE (V)
		b	c	d	e	f	g	h	j	k			
0.5s											< 0.168	Approx. -7.6	-12
0.2s	○										0.168 ~ 0.301	Approx. -6.9	↓
0.1s		○									0.302 ~ 0.504	Approx. -5.9	
50ms			○					○			0.505 ~ 0.704	↓	
20ms	○		○			○		○			0.705 ~ 0.838		
10ms		○	○				○	○			0.839 ~ 1.044		
5ms				○					○		1.045 ~ 1.247	↓	
2ms	○			○		○			○		1.248 ~ 1.381		
1ms		○		○			○		○		1.382 ~ 1.584		
0.5ms			○	○				○	○		1.585 ~ 1.784	↓	
0.2ms	○		○	○		○		○	○		1.785 ~ 1.918		
0.1ms		○	○	○			○	○	○		1.919 ~ 2.124		
50µs					○					○	2.125 ~ 2.327	↓	0
20µs	○				○	○				○	2.328 ~ 2.461		↓
10µs		○			○		○			○	2.462 ~ 2.664		
5µs			○		○			○		○	2.665 ~ 2.864	↓	
2µs	○		○		○	○		○		○	2.865 ~ 2.998		
1µs		○	○		○		○	○		○	2.999 ~ 3.204		
0.5µs				○	○				○	○	3.205 ~ 3.407	↓	
0.2µs	○			○	○	○			○	○	3.408 ~ 3.541		
0.1µs		○		○	○		○		○	○	3.542 ~ 3.743		
0.05µs			○	○	○			○	○	○	> 3.743	Approx. -7.6	
IECK POINTS	X73-2070-00										P11-3, 2	P10-9, 4	P10-6, 1
	X77-1870-00										P23-11, 13		

CIRCUIT DESCRIPTION

- **CH1 ATT & CH2 ATT voltage check table**

V-Range (/div)	Voltage range (V)
5V	4.124 ~ 4.450
2V	3.790 ~ 4.123
1V	3.456 ~ 3.789
0.5V	3.130 ~ 3.455
0.2V	2.804 ~ 3.129
0.1V	2.470 ~ 2.803
50mV	2.136 ~ 2.469
20mV	1.810 ~ 2.135
10mV	1.484 ~ 1.809
5mV	1.150 ~ 1.483
2mV	0.816 ~ 1.149
1mV	0.490 ~ 0.815

Fig. 3

CH1 CHECK POINT P23-4
CH2 CHECK POINT P23-6

- **UNCAL voltage check table**

CH1 CAL	CH2 CAL	SWP CAL	Voltage range (V)
>	>	>	4.406 ~ 4.860
>	>	CAL	3.777 ~ 4.405
>	CAL	>	3.147 ~ 3.776
>	CAL	CAL	2.518 ~ 3.146
CAL	>	>	1.888 ~ 2.517
CAL	>	CAL	1.257 ~ 1.887
CAL	CAL	>	0.626 ~ 1.256
CAL	CAL	CAL	0.156 ~ 0.625

Fig. 4

CHECK POINT P23-15

- **SWEEP CODE voltage check table**

SWEEP TIME (/div)	Voltage range (V)
50ns	≧ 3.744
0.1μs	3.542 ~ 3.743
0.2μs	3.408 ~ 3.541
0.5μs	3.205 ~ 3.407
1μs	2.999 ~ 3.204
2μs	2.865 ~ 2.998
5μs	2.665 ~ 2.864
10μs	2.462 ~ 2.664
20μs	2.328 ~ 2.461
50μs	2.125 ~ 2.327
0.1ms	1.919 ~ 2.124
0.2ms	1.785 ~ 1.918
0.5ms	1.585 ~ 1.784
1ms	1.382 ~ 1.585
2ms	1.248 ~ 1.381
5ms	1.045 ~ 1.247
10ms	0.839 ~ 1.044
20ms	0.705 ~ 0.838
50ms	0.505 ~ 0.704
0.1s	0.302 ~ 0.504
0.2s	0.168 ~ 0.301
0.5s	≦ 0.167

Fig. 5

CHECK POINT
A SWEEP P23-11
B SWEEP P23-13

- **V-MODE level check table**

V-MODE								
CH1	OFF	ON	OFF	ON	OFF	ON	OFF	ON
ADD	OFF	OFF	ON	ON	OFF	OFF	ON	ON
CH2	OFF	OFF	OFF	OFF	ON	ON	ON	ON
	↓	↓	↓	↓	↓	↓	↓	↓
$\overline{\text{CH1}}$	L	L	H	L	H	L	H	L
$\overline{\text{ADD}}$	H	H	L	L	H	H	L	L
$\overline{\text{CH2}}$	H	H	H	H	L	L	L	L
	↓	↓	↓	↓	↓	↓	↓	↓
Display	CH1 (CH3)*	CH1	CH1 + CH2	CH1 + CH2	CH2	CH1 CH2	CH1 + CH2	CH1 + CH2

* CH3 display is used when only CH3 is ON.

Fig. 6

CHECK POINT P23-4
P23-10
P24-6

- **MAG level check**

ON	OFF
L	H

CHECK POINT P23-17

Fig. 7

- **CH2 INV level check table**

ON	OFF
L	H

CHECK POINT P23-12

Fig. 8

- **B TRIG'D level check table**

ON	OFF
L	H

CHECK POINT P23-19

Fig. 9

- **H DISPLAY voltage check table**

	Output voltage range (V)
A	≧ 2.085
ALT	1.381 ~ 2.084
B	0.704 ~ 1.380
X-Y	≦ 0.703

CHECK POINT P23-20

Fig. 10

- **Probe voltage check table**

	Output voltage range (V)
1/1	≧ 4.197
1/10	3.176 ~ 4.196
1/100	≦ 3.175

CHECK POINT
CH1PB : P23-3
CH2PB : P23-5

Fig. 11

- **CURSOR voltage check table**

ON	OFF
L	H

Fig. 12

When ADD is selected with V-MODE

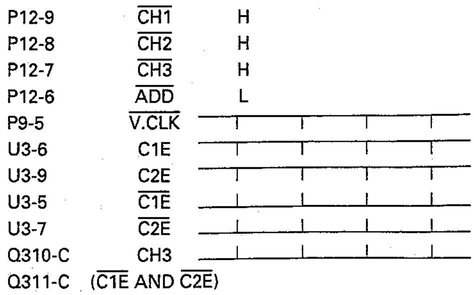

P12-9 CH1 H
P12-8 CH2 H
P12-7 CH3 H
P12-6 ADD L
P9-5 V.CLK
U3-6 C1E
U3-9 C2E
U3-5 C1E
U3-7 C2E
Q310-C CH3
Q311-C (C1E AND C2E)

Fig. 1-d

There are 16 combinations obtained from the 4 states, and it is abnormal if all of these are "H".
When more than one combination are used, the state is switched at the negative going of $\overline{\text{V.CLK}}$ in the order shown below:

$$\rightarrow \text{CH1} \rightarrow \text{CH3} \rightarrow \text{CH2} \rightarrow \text{ADD} \rightarrow$$

SWEEP CODE		A SWEEP					B SWEEP					VOLTAGE RANGE (V)	VOLTAGE (V)	VOLTAGE (V)
	S301	a	b	c	d	e	f	g	h	j	k			
SWEEP TIME/DIV	0.5s											< 0.168	Approx. -7.6	-12
	0.2s	○										0.168 ~ 0.301	Approx. -6.9	↓
	0.1s		○									0.302 ~ 0.504	Approx. -5.9	
	50ms			○					○			0.505 ~ 0.704	↓	
	20ms	○		○			○		○			0.705 ~ 0.838		
	10ms		○	○				○	○			0.839 ~ 1.044		
	5ms				○					○		1.045 ~ 1.247	↓	
	2ms	○			○		○			○		1.248 ~ 1.381		
	1ms		○		○			○		○		1.382 ~ 1.584		
	0.5ms			○	○				○	○		1.585 ~ 1.784	↓	
	0.2ms	○		○	○		○		○	○		1.785 ~ 1.918		
	0.1ms		○	○	○			○	○	○		1.919 ~ 2.124		
	50µs					○					○	2.125 ~ 2.327	↓	0
	20µs	○				○	○				○	2.328 ~ 2.461		↓
	10µs		○			○		○			○	2.462 ~ 2.664		
	5µs			○		○			○		○	2.665 ~ 2.864	↓	
	2µs	○		○		○	○		○		○	2.865 ~ 2.998		
	1µs		○	○		○		○	○		○	2.999 ~ 3.204		
	0.5µs				○	○				○	○	3.205 ~ 3.407	↓	
	0.2µs	○			○	○	○			○	○	3.408 ~ 3.541		
	0.1µs		○		○	○		○		○	○	3.542 ~ 3.743		
	0.05µs			○	○	○			○	○	○	> 3.743	Approx. -7.6	
CHECK POINTS		X73-2070-00										P11-3, 2	P10-9, 4	P10-6, 1
		X77-1870-00										P23-11, 13		

Fig. 2

CIRCUIT DESCRIPTION

• CH1 ATT & CH2 ATT voltage check table

V-Range (/div)	Voltage range (V)
5V	4.124 ~ 4.450
2V	3.790 ~ 4.123
1V	3.456 ~ 3.789
0.5V	3.130 ~ 3.455
0.2V	2.804 ~ 3.129
0.1V	2.470 ~ 2.803
50mV	2.136 ~ 2.469
20mV	1.810 ~ 2.135
10mV	1.484 ~ 1.809
5mV	1.150 ~ 1.483
2mV	0.816 ~ 1.149
1mV	0.490 ~ 0.815

Fig. 3

CH1 CHECK POINT P23-4
CH2 CHECK POINT P23-6

• UNCAL voltage check table

CH1 CAL	CH2 CAL	SWP CAL	Voltage range (V)
>	>	>	4.406 ~ 4.860
>	>	CAL	3.777 ~ 4.405
>	CAL	>	3.147 ~ 3.776
>	CAL	CAL	2.518 ~ 3.146
CAL	>	>	1.888 ~ 2.517
CAL	>	CAL	1.257 ~ 1.887
CAL	CAL	>	0.626 ~ 1.256
CAL	CAL	CAL	0.156 ~ 0.625

Fig. 4

CHECK POINT P23-15

• SWEEP CODE voltage check table

SWEEP TIME (/div)	Voltage range (V)
50ns	≧ 3.744
0.1μs	3.542 ~ 3.743
0.2μs	3.408 ~ 3.541
0.5μs	3.205 ~ 3.407
1μs	2.999 ~ 3.204
2μs	2.865 ~ 2.998
5μs	2.665 ~ 2.864
10μs	2.462 ~ 2.664
20μs	2.328 ~ 2.461
50μs	2.125 ~ 2.327
0.1ms	1.919 ~ 2.124
0.2ms	1.785 ~ 1.918
0.5ms	1.585 ~ 1.784
1ms	1.382 ~ 1.585
2ms	1.248 ~ 1.381
5ms	1.045 ~ 1.247
10ms	0.839 ~ 1.044
20ms	0.705 ~ 0.838
50ms	0.505 ~ 0.704
0.1s	0.302 ~ 0.504
0.2s	0.168 ~ 0.301
0.5s	≦ 0.167

Fig. 5

CHECK POINT
A SWEEP P23-11
B SWEEP P23-13

• V-MODE level check table

V-MODE								
CH1	OFF	ON	OFF	ON	OFF	ON	OFF	ON
ADD	OFF	OFF	ON	ON	OFF	OFF	ON	ON
CH2	OFF	OFF	OFF	OFF	ON	ON	ON	ON
	↓	↓	↓	↓	↓	↓	↓	↓
$\overline{\text{CH1}}$	L	L	H	L	H	L	H	L
$\overline{\text{ADD}}$	H	H	L	L	H	H	L	L
$\overline{\text{CH2}}$	H	H	H	H	L	L	L	L
	↓	↓	↓	↓	↓	↓	↓	↓
Display	CH1 (CH3)*	CH1	CH1 + CH2	CH1 + CH2	CH2	CH1 CH2	CH1 + CH2	CH1 + CH2

* CH3 display is used when only CH3 is ON.

Fig. 6

CHECK POINT P23-4
P23-10
P24-6

• MAG level check

ON	OFF
L	H

CHECK POINT P23-17

Fig. 7

• CH2 INV level check table

ON	OFF
L	H

CHECK POINT P23-12

Fig. 8

• B TRIG'D level check table

ON	OFF
L	H

CHECK POINT P23-19

Fig. 9

• H DISPLAY voltage check table

	Output voltage range (V)
A	≧ 2.085
ALT	1.381 ~ 2.084
B	0.704 ~ 1.380
X-Y	≦ 0.703

CHECK POINT P23-20

Fig. 10

• Probe voltage check table

	Output voltage range (V)
1/1	≧ 4.197
1/10	3.176 ~ 4.196
1/100	≦ 3.175

CHECK POINT
CH1PB : P23-3
CH2PB : P23-5

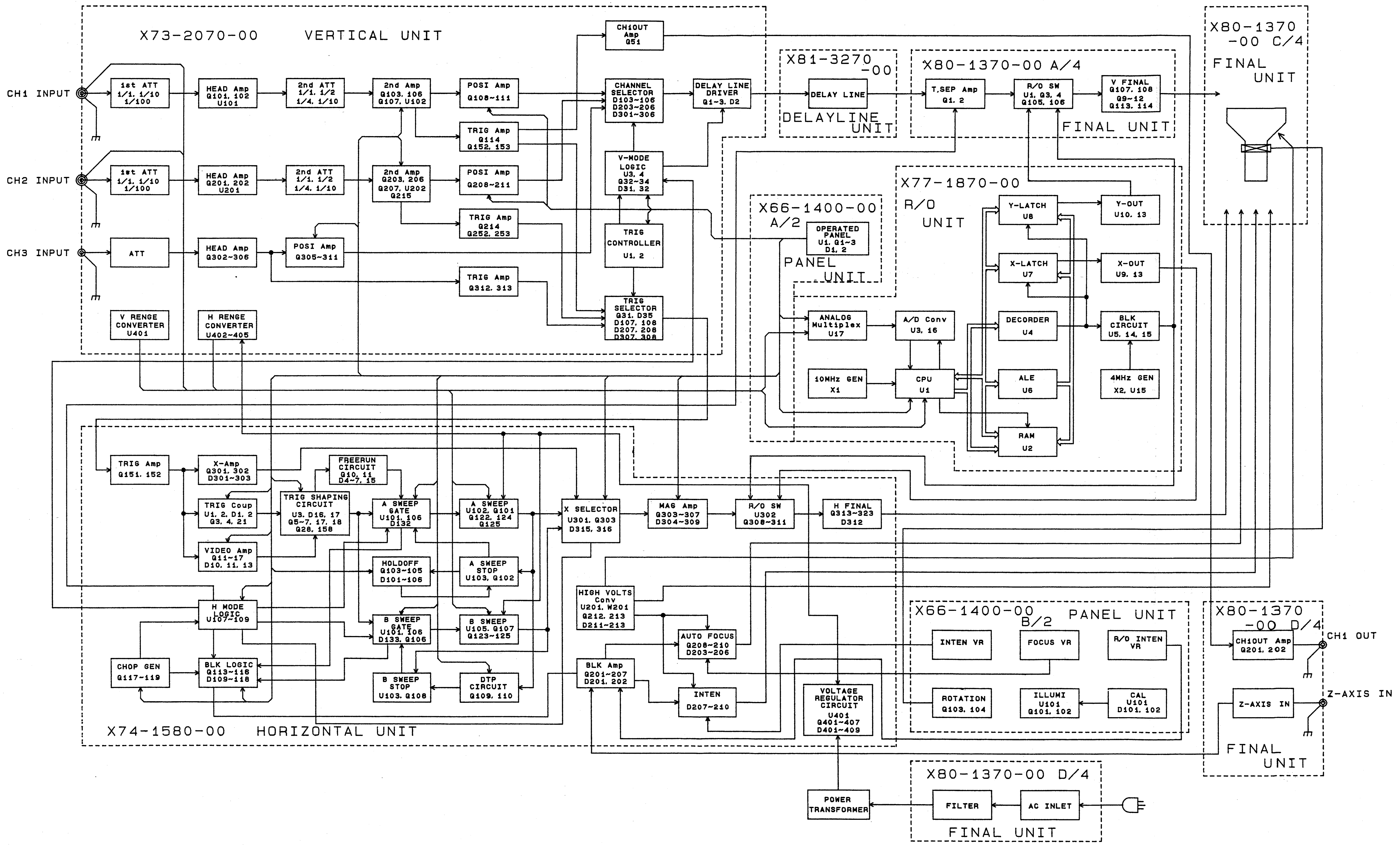
Fig. 11

• CURSOR voltage check table

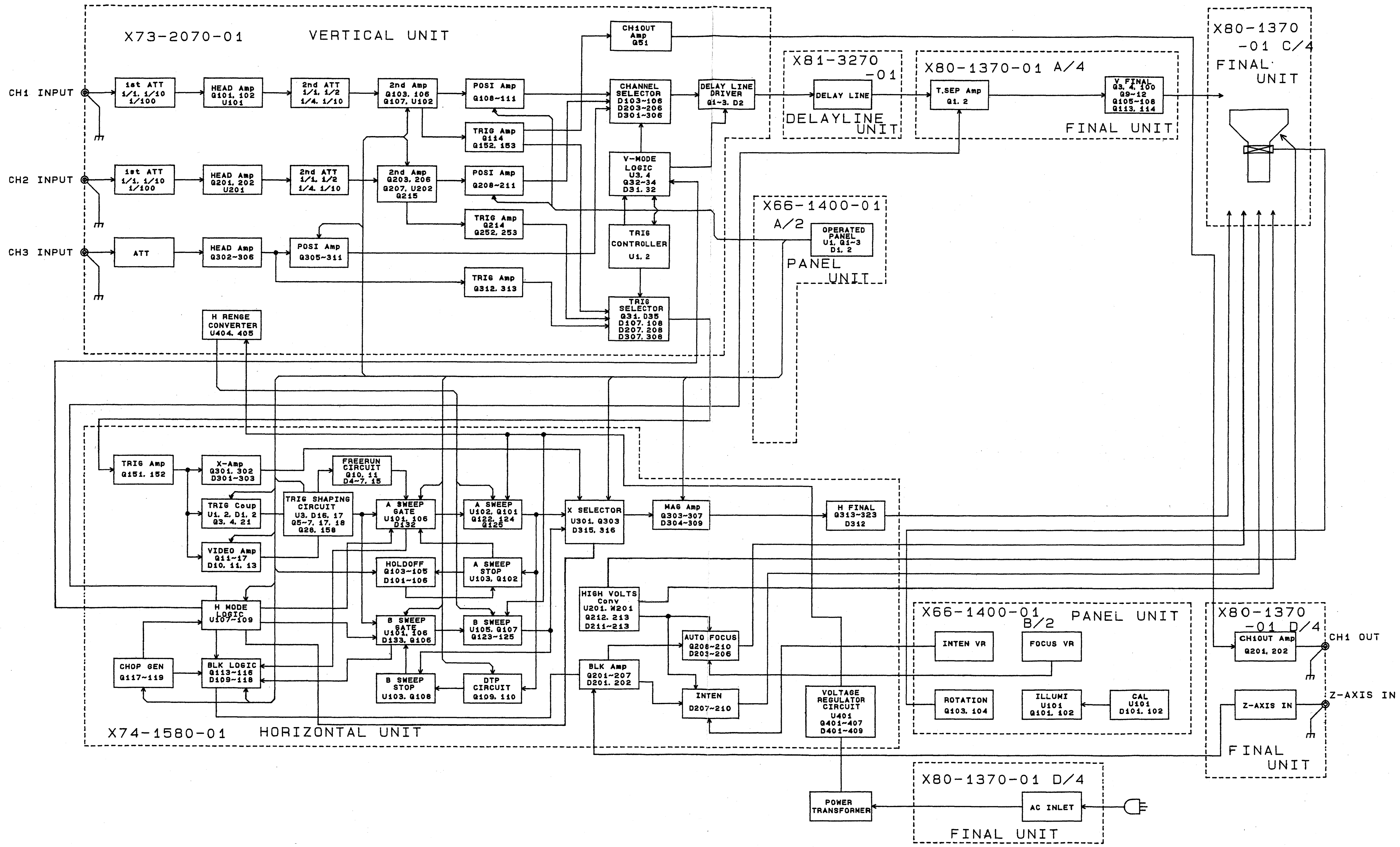
ON	OFF
L	H

Fig. 12

CS-5230 BLOCK DIAGRAM


X73-2070-00 VERTICAL UNIT
CH1 INPUT
CH2 INPUT
CH3 INPUT
1st ATT 1/1. 1/10 1/100
HEAD Amp Q101. 102 U101
2nd ATT 1/1. 1/2 1/4. 1/10
2nd Amp Q103. 106 Q107. U102
POSI Amp Q108~111
TRIG Amp Q114 Q152. 153
1st ATT 1/1. 1/10 1/100
HEAD Amp Q201. 202 U201
2nd ATT 1/1. 1/2 1/4. 1/10
2nd Amp Q203. 206 Q207. U202 Q215
POSI Amp Q208~211
TRIG Amp Q214 Q252. 253
ATT
HEAD Amp Q302~306
POSI Amp Q305~311
TRIG Amp Q312. 313
V RENGE CONVERTER U401
H RENGE CONVERTER U402~405
CH1OUT Amp Q51
CHANNEL SELECTOR D103~106 D203~206 D301~306
DELAY LINE DRIVER Q1~3. D2
V-MODE LOGIC U3. 4 Q32~34 D31. 32
TRIG CONTROLLER U1. 2
TRIG SELECTOR Q31. D35 D107. 108 D207. 208 D307. 308
X81-3270-00
DELAY LINE
DELAYLINE UNIT
X80-1370-00 A/4
T.SEP Amp Q1. 2
R/O SW U1. Q3. 4 Q105. 106
V FINAL Q107. 108 Q9~12 Q113. 114
FINAL UNIT
X80-1370-00 C/4
FINAL UNIT
X66-1400-00 A/2
OPERATED PANEL U1. Q1~3 D1. 2
PANEL UNIT
X77-1870-00
R/O UNIT
Y-LATCH U8
Y-OUT U10. 13
X-LATCH U7
X-OUT U9. 13
ANALOG Multiplex U17
A/D Conv U3. 16
DECORDER U4
BLK CIRCUIT U5. 14. 15
10MHz GEN X1
CPU U1
ALE U6
4MHz GEN X2. U15
RAM U2
TRIG Amp Q151. 152
X-Amp Q301. 302 D301~303
FREERUN CIRCUIT Q10. 11 D4~7. 15
TRIG Coup U1. 2. D1. 2 Q3. 4. 21
TRIG SHAPING CIRCUIT U3. D16. 17 Q5~7. 17. 18 Q28. 158
A SWEEP GATE U101. 106 D132
A SWEEP U102. Q101 Q122. 124 Q125
X SELECTOR U301. Q303 D315. 316
MAG Amp Q303~307 D304~309
R/O SW U302 Q308~311
H FINAL Q313~323 D312
VIDEO Amp Q11~17 D10. 11. 13
HOLDOFF Q103~105 D101~106
A SWEEP STOP U103. Q102
H MODE LOGIC U107~109
B SWEEP GATE U101. 106 D133. Q106
B SWEEP U105. Q107 Q123~125
HIGH VOLTS Conv U201. W201 Q212. 213 D211~213
AUTO FOCUS Q208~210 D203~206
CHOP GEN Q117~119
BLK LOGIC Q113~116 D109~118
B SWEEP STOP U103. Q108
DTP CIRCUIT Q109. 110
BLK Amp Q201~207 D201. 202
INTEN D207~210
VOLTAGE REGULATOR CIRCUIT U401 Q401~407 D401~409
X74-1580-00 HORIZONTAL UNIT
X66-1400-00 B/2 PANEL UNIT
INTEN VR
FOCUS VR
R/O INTEN VR
ROTATION Q103. 104
ILLUMI U101 Q101. 102
CAL U101 D101. 102
X80-1370-00 D/4
CH1OUT Amp Q201. 202
CH1 OUT
Z-AXIS IN
Z-AXIS IN
FINAL UNIT
POWER TRANSFORMER
X80-1370-00 D/4
FILTER
AC INLET
FINAL UNIT

CS-5235 BLOCK DIAGRAM


X73-2070-01 VERTICAL UNIT
CH1 INPUT
CH2 INPUT
CH3 INPUT
1st ATT 1/1. 1/10 1/100
HEAD Amp Q101. 102 U101
2nd ATT 1/1. 1/2 1/4. 1/10
2nd Amp Q103. 106 Q107. U102
POSI Amp Q108~111
TRIG Amp Q114 Q152. 153
1st ATT 1/1. 1/10 1/100
HEAD Amp Q201. 202 U201
2nd ATT 1/1. 1/2 1/4. 1/10
2nd Amp Q203. 206 Q207. U202 Q215
POSI Amp Q208~211
TRIG Amp Q214 Q252. 253
ATT
HEAD Amp Q302~306
POSI Amp Q305~311
TRIG Amp Q312. 313
H RENGE CONVERTER U404. 405
CH1OUT Amp Q51
CHANNEL SELECTOR D103~106 D203~206 D301~306
DELAY LINE DRIVER Q1~3. D2
V-MODE LOGIC U3. 4 Q32~34 D31. 32
TRIG CONTROLLER U1. 2
TRIG SELECTOR Q31. D35 D107. 108 D207. 208 D307. 308
X81-3270 -01
DELAY LINE
DELAYLINE UNIT
X80-1370-01 A/4
T.SEP Amp Q1. 2
V FINAL Q3. 4. 100 Q9~12 Q105~108 Q113. 114
FINAL UNIT
X80-1370 -01 C/4
FINAL UNIT
X66-1400-01 A/2
OPERATED PANEL U1. Q1~3 D1. 2
PANEL UNIT
X74-1580-01 HORIZONTAL UNIT
TRIG Amp Q151. 152
X-Amp Q301. 302 D301~303
FREERUN CIRCUIT Q10. 11 D4~7. 15
TRIG Coup U1. 2. D1. 2 Q3. 4. 21
TRIG SHAPING CIRCUIT U3. D16. 17 Q5~7. 17. 18 Q28. 158
VIDEO Amp Q11~17 D10. 11. 13
A SWEEP GATE U101. 106 D132
A SWEEP U102. Q101 Q122. 124 Q125
HOLDOFF Q103~105 D101~106
A SWEEP STOP U103. Q102
H MODE LOGIC U107~109
B SWEEP GATE U101. 106 D133. Q106
B SWEEP U105. Q107 Q123~125
CHOP GEN Q117~119
BLK LOGIC Q113~116 D109~118
B SWEEP STOP U103. Q108
DTP CIRCUIT Q109. 110
X SELECTOR U301. Q303 D315. 316
MAG Amp Q303~307 D304~309
H FINAL Q313~323 D312
HIGH VOLTS Conv U201. W201 Q212. 213 D211~213
AUTO FOCUS Q208~210 D203~206
BLK Amp Q201~207 D201. 202
INTEN D207~210
VOLTAGE REGULATOR CIRCUIT U401 Q401~407 D401~409
X66-1400-01 B/2 PANEL UNIT
INTEN VR
FOCUS VR
ROTATION Q103. 104
ILLUMI U101 Q101. 102
CAL U101 D101. 102
X80-1370 -01 D/4
CH1OUT Amp Q201. 202
CH1 OUT
Z-AXIS IN
Z-AXIS IN
FINAL UNIT
POWER TRANSFORMER
X80-1370-01 D/4
AC INLET
FINAL UNIT

ADJUSTMENT

To obtain the best performance, periodically calibrate the unit. Sometimes, only one mode need be calibrated, while at other times, all modes should be calibrated. When one mode is calibrated, it must be noted that the other modes may be affected. When calibrating all modes, perform the calibration in the specified sequence.

The following calibration required an accurate measuring instrument and an insulated adjusting flat blade screwdriver. If they are not available, contact your dealer. For optimum adjustment, turn the power on and warm up the scope sufficiently (more than 30 minutes) before starting.

Before calibrating the scope, check the power supply voltage.

TEST EQUIPMENT REQUIRED

The following instrument or their equivalent should be used for making adjustment.

Test Equipment	Model	Minimum Specification
Digital Multi-Meter	DL-712 (KENWOOD)	Impedance: More than 10 MΩ, Measuring range: 0.2 V to 1000 V
Sine-Wave Generator	651 B (YHP)	Frequency: 10 Hz to 10 MHz, constant voltage over tuning range
Sine-Wave Generator	SG-503 (Tektronix)	Frequency: 50 kHz to 100 MHz, Output impedance: 50 Ω, constant voltage over tuning range
Square-Wave Generator	PG-506 (Tektronix)	Output signal: 1 kHz, Amplitude: 10 mVp-p to 10 Vp-p, Accuracy: within ±1%, Rise time: 35ns or less 100 kHz, Rise time: 1 ns or less
Q Meter	4343B (YHP)	—
Color Pattern Generator	CG-921 (KENWOOD)	—
Oscilloscope	CS-6040 (KENWOOD)	Sensitivity: more than 1 mV Frequency response: More than 150 MHz
Time-Marker Generator	TG-501 (Tektronix)	Time mark: 0.5 s to 0.1μs repetive waveform
High-Voltage Probe	—	Input Impedance: 1000 MΩ
Termination	—	Impedance: 50 Ω Accuracy: within 3%
Termination	—	3 watts type impedance: 50 Ω
Attenuator	—	−20 dB attenuation (50 Ω)

Table 1

PREPARATION FOR ADJUSTMENT

Control Settings

The control settings listed below must be used for each adjustment procedure.

Exceptions to these settings will be noted as they occur. After completing a adjustment, return the controls to the following settings.

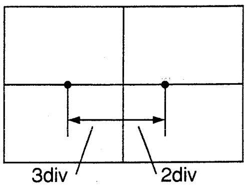
NAME OF KNOBS	POSITION
INTEN	12 o'clock
FOCUS	Optimum position
CH1, CH2, CH3 ▲▼ POSITION	Mechanical center
◄ ► POSITION	Mechanical center
×10 MAG	OFF
VARIABLE, H.VARIABLE (VOLTS/DIV, SWEEP TIME/DIV)	CAL
AC-GND-DC (CH1 and CH2)	DC (GND at no signal)
VERTICAL MODE	CH1
HORIZONTAL MODE	A
TRIGGERING COUPLING	AC
TRIGGERING SOURCE	VERT MODE
TRIGGERING MODE	AUTO
TRIGGERING LEVEL	Mechanical center
VOLTS/DIV (CH1 and CH2)	5 V/DIV
A/B SWEEP TIME/DIV	0.5 s/50 ms
TRACE SEP	Fully CCW
HOLD OFF	Fully CCW
SLOPE	■ +

Table 2

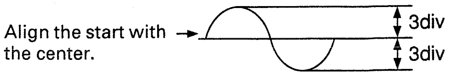
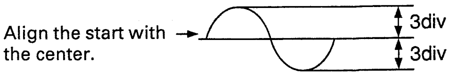
ADJUSTMENT

Item	Adjustment	P.C.B.	Procedure
Operating voltage	VR4 VR303	X80-1370 X74-1580	V.MODE: CH1, CH2. AC-DC: GND (both CH), VOLTS: 10 mV (both CH), H.DISP: X-Y, R/O: OFF 1) Move the spot to the CRT center by operating the POSI controls. 2) Attach the multimeter probes across P5-1 and GND of X80-1370 and adjust VR4 to the voltage 33.5 V. 3) Attach the multimeter probes across P7-1 and GND of X74-1580 and adjust VR303 so that the voltage is 70 V. 4) Attach the probe to P7-4 and ensure that the voltage reading is approx. 70 V.
Focus Center and ASTIG	VR201	X74-1580	V.MODE: CH1, CH2, AC-DC: GND (both CH), VOLTS: 10 mV (both CH), H.DISP: X-Y 1) Move the spot to the CRT center by operating the POSI controls. 2) Adjust the spot to the best point with FOCUS on the panel and ASTIG (VR305). 3) Set FOCUS on the panel to the 12:00 position and adjust VR201 to move the spot to the best point.
Intensity	VR202	X74-1580	V.MODE: CH1, CH2. AC-DC: GND (both CH), VOLTS: 10 mV (both CH), H.DISP: X-Y 1) Set INTEN to the 10:00 position. 2) At the 10:00 position, adjust so that the spot disappears.
Cursor Y-Gain and POSI * In case the R/O unit is not used, ignore this item.	VR3 (Gain) VR2 (POSI)	X80-1370	V.MODE: CH1, CH2. AC-DC: GND (both CH), VOLTS: 10 mV (both CH), H.DISP: A, R/O: ON, A.SWEEP: 1 ms 1) Set the R/O display to 6.00 by operating the cursor POSI controls. 2) Adjust VR3 and VR2 so that the interval between cursors is 6 div. 3) Maximize the cursor interval by operating the cursor POSI controls. 4) Adjust VR2 to make it uniform.
Cursor X-Gain and POSI * In case the R/O unit is not used, adjust only VR304. The VR can be used to adjust the length of the SWEEP TIME 1 ms trace.	VR304 (Gain) VR306 (POSI)	X74-1580	V.MODE: CH1, CH2. AC-DC: GND (both CH), VOLTS: 10 mV (both CH), H.DISP: A, R/O: ON (1/△T), A.SWEEP: 1 ms 1) Set the R/O display to 8.00 by operating the cursor POSI controls. 2) Adjust VR304 and V306 so that the cursor interval is 8 div.. 3) Maximize the cursor interval by operating the cursor POSI controls. 4) Adjust VR306 to make it uniform. In case the R/O unit is not used, VR304 is to be adjusted in the SWEEP TIME 1 ms adjustment.
CH1 Gain	VR1 (10 mV) VR102 (1 mV)	X80-1370 X73-2070	V.MODE: CH1, AC-DC: DC, H.DISP: A, VOLTS: 10 mV, VARI: CAL. 1) Input a 50 mV square wave signal. 2) Adjust so that the amplitude is 5 div. (10 mV range) 3) Switch VOLTS to 1 mV and input a 5 mV square wave signal. 4) Adjust so that the amplitude is 5 div. (1 mV range)
CH2 Gain	VR207 (10 mV) VR202 (1 mV)	X73-2070	V.MODE: CH2, AC-DC: DC, H DISP: A, VOLTS: 10 mV, VARI: CAL. 1) Input a 50 mV square wave signal. 2) Adjust so that the amplitude is 5 div. (10 mV range) 3) Switch VOLTS to 1 mV and input a 5 mV square wave signal. 4) Adjust so that the amplitude is 5 div. (1 mV range)

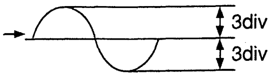
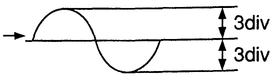
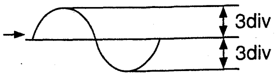
ADJUSTMENT

Item	Adjustment	P.C.B.	Procedure
X-Gain * In case the R/O unit is not used, do not adjust this item now but adjust after H.POSI.	VR308	X74-1580	H.DISP: X-Y, AC-DC: DC VOLTS: 10 mV, VARI: CAL. 1) Input a 50 mV square wave signal to CH2. 2) Adjust so that the amplitude is 5 div. (10 mV range) * Make the adjustment to 5 div., at the CRT center. 
CH3 Gain	VR301	X73-2070	V.MODE: CH3, H.DISP: A 1) Input a 0.5 V square wave signal. 2) Adjust so that the amplitude is 5 div. (0.1 V range)
CH1 Step ATT Balance	VR103	X73-2070	V.MODE: CH1, AC-DC: GND (both CH) VOLTS: 5 mV (both CH) H.DISP: A 1) Adjust so that the trance does not move when VOLTS is switched from 5 mV to 2 mV. * Adjust after switching to 2 mV with reference to the 5 mV position.
CH1 VARIABLE Balance	VR104	X73-2070	V.MODE: CH1, AC-DC: GND (both CH) VOLTS: 5 mV (both CH) H.DISP: A Adjust by setting VARIABLE to the MIN (fully counterclockwise) position with reference to the MAX (CAL) position. * Ensure that the trace does not move when VARIABLE is switched between MIN ↔ MAX.
CH2 Step ATT Balance	VR203	X73-2070	V.MODE: CH2, AC-DC: GND, VOLTS: 5 mV, H.DISP: A. 1) Adjust so that the trace does not move when VOLTS is switched from 5 mV to 2 mV. * Adjust after switching to 2 mV with reference to the 5 mV position.
CH2 VARIABLE Balance	VR204	X73-2070	V.MODE: CH2, AC-DC: GND, VOLTS: 5 mV, H.DISP: A. 1) Adjust by setting VARIABLE to the MIN (fully counterclockwise) position with reference to the MAX (CAL) position. * Ensure that the trace does not move when VARIABLE is switched between MIN ↔ MAX.
CH2 INV Balance	VR208	X73-2070	V.MODE: CH2, AC-DC: GND, VOLTS: 5 mV, H.DISP: A. 1) Adjust so that the trace does not move when CH2 INV is switched ON-OFF. 2) Check CH2 STEP ATT BAL and VARI BAL and, if any is deviated, re-adjust following the adjustment procedure.
ADD POSI	VR1	X73-2070	V.MODE: CH1, ADD, AC-DC: GND, VOLTS: 5 mV H.DISP: A 1) Superimpose the two displayed traces by operating CH2 POSI. 2) Switch V.MODE CH2 ON. (After this, CH1, CH2 and ADD of V.MODE are ON.) 3) Superimpose the two displayed traces b operating CH1 POSI. 4) Adjust the trace to the center of scale. (The CRT seems to display a single trace but it actually consists of a superimposition of 3 traces.)

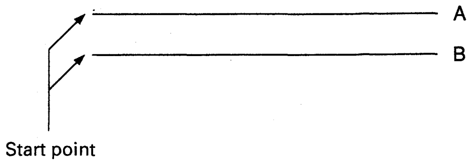
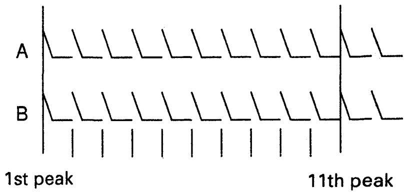
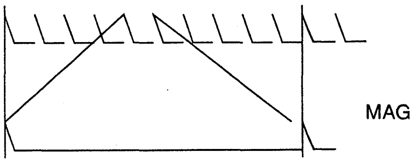
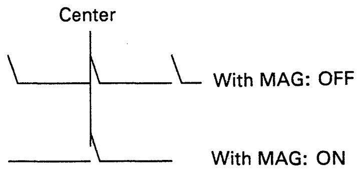
ADJUSTMENT

Item	Adjustment	P.C.B.	Procedure
V.POSI Center	VR106 (CH1) VR206 (CH2) VR302 (CH3)	X73-2070	V.MODE: CH1, CH2, CH3, VOLTS: 5 mV, H.DISP: A, AC-DC: GND. 1) Set POSI of each CH to the 12:00 position. 2) Adjust the trace of each CH to the scale center.
CH1 Waveform Shaping	TC102 (0.1 V) TC104 (1 V)	X73-2070	V.MODE: CH1, AC-DC: DC, VARI: CAL, VOLTS: 10 mV (ideal waveform), H.DISP: A. 1) Input a 1 kHz square wave to the CH1 input. 2) Adjust so that the waveforms at 0.1 V and 1 V are flat.
CH2 Waveform Shaping	TC202 (0.1 V) TC204 (1 V)	X73-2070	V.MODE: CH2, AC-DC: DC, VARI: CAL, VOLTS: 10 mV (ideal waveform), H.DISP: A. 1) Input a 1 kHz square wave to the CH2 input. 2) Adjust so that the waveforms at 0.1 V and 1 V are flat.
CH3 Waveform Shaping	TC301	X73-2070	V.MODE: CH3, H.DISP: A. 1) Input a 1 kHz square wave to the CH1 input and adjust so that the waveform is flat.
Input Capacity	TC101 (0.1 V) TC103 (1 V)	X73-2070	V.MODE: CH1, AC-DC: DC, VARI: CAL, VOLTS: 10 mV (reference), H.DISP: A. 1) Connect a capacity meter to the CH1 input. 2) Measure the capacity of the 10 mV range. (No more than 25 p) 3) At 0.1 V and 1 V, adjust to obtain the same values as 10 mV.
Input Capacity	TC201 (0.1 V) TC203 (1 V)	X73-2070	V.MODE: CH2 AC-DC: DC, VARI: CAL, VOLTS: 10 mV (reference), H.DISP: A. 1) Connect a capacity meter to the CH2 input. 2) Measure the capacity of the 10 mV range. (No more than 25 p) 3) At 0.1 V and 1 V, adjust to obtain the same values as 10 mV.
FIX Level	VR2	X74-1580	V.MODE: CH1, AC-DC: DC, VOLTS: 0.1 V, TRIG MODE: FIX, SWEEP T: 0.2 ms. 1) Input 1 kHz sine wave to CH1 and set it so that it extends by 3 div., above and below the scale center line. 2) Adjust so that the waveform starts from the scale center line when SLOPE is switched between +/-. 3) Set the amplitude to 1 div., switch SLOPE to + and -, and ensure that triggering is applied. (If it is not applied, re-adjust now.) 
TRIG Level	VR1	X74-1580	V.MODE: CH1, AC-DC: DC, VOLTS: 0.1 V, TRIG MODE: AUTO, SWEEP T: 0.2 ms. 1) Input 1 kHz sine wave to CH1 and set it so that it extends by 3 div., above and below the scale center line. 2) Set TRIG LEVEl to the 12:00 position and adjust so that the waveform starts from the scale center line. 

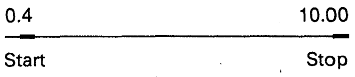
ADJUSTMENT

Item	Adjustment	P.C.B.	Procedure
CH1 TRIG DC Coupling	VR105	X73-2070	V.MODE: CH1, AC-DC: DC, VOLTS: 0.1 V, TRIG MODE: AUTO, SWEEP T: 0.2 ms, COUPLING: AC. 1) Input 1 kHz sine wave to CH1 and set it so that it extends by 3 div., above and below the scale center line. 2) Adjust TRIG LEVEL so that the waveform starts from the scale center line. 3) Switch COUPLING to DC and adjust so that the waveform starts from the scale center line.  Align the start with the center.
CH2 TRIG DC Coupling	VR205	X73-2070	V.MODE: CH2, AC-DC: DC, VOLTS: 0.1 V, TRIG MODE: AUTO, SWEEP T: 0.2 ms, COUPLING: AC. 1) Input 1 kHz sine wave to CH2 and set it so that it extends by 3 div., above and below the scale center line. 2) Adjust TRIG LEVEL so that the waveform starts from the scale center line. 3) Switch COUPLING to DC and adjust so that the waveform starts from the scale center line.  Align the start with the center.
CH3 TRIG DC Coupling	VR303	X73-2070	V.MODE: CH3, TRIG MODE: AUTO, SWEEP T: 0.2 ms. 1) Set the trace to the scale center by operating V.POSI. 2) Input a 1 kHz sine wave to CH1 and set it so that it extends by 3 div., above and below the scale center line. (As CH3 is fixed to DC, it may not be triggered at this time. But it can be triggered by adjustment.) 3) Adjust so that the waveform starts from the scale center line.  Align the start with the center.
TRIG ADD	VR31	X73-2070	V.MODE: CH1, CH2, AC-DC: DC, VOLTS: 0.1 V, TRIG MODE: AUTO, SWEEP T: 0.2 ms, COUPLING: AC 1) Set the traces of each CH to the scale center position by operating V.POSI. 2) Switch CH1 and CH2 to OFF and ADD to ON. 3) Input a 1 kHz sine wave to CH1 and set it so that it extends by 3 div., above and below the scale center line. 4) Adjust TRIG LEVEL so that the waveform starts from the scale center line. 5) Switch COUPLING to DC and adjust so that the waveform starts from the scale center line.

ADJUSTMENT

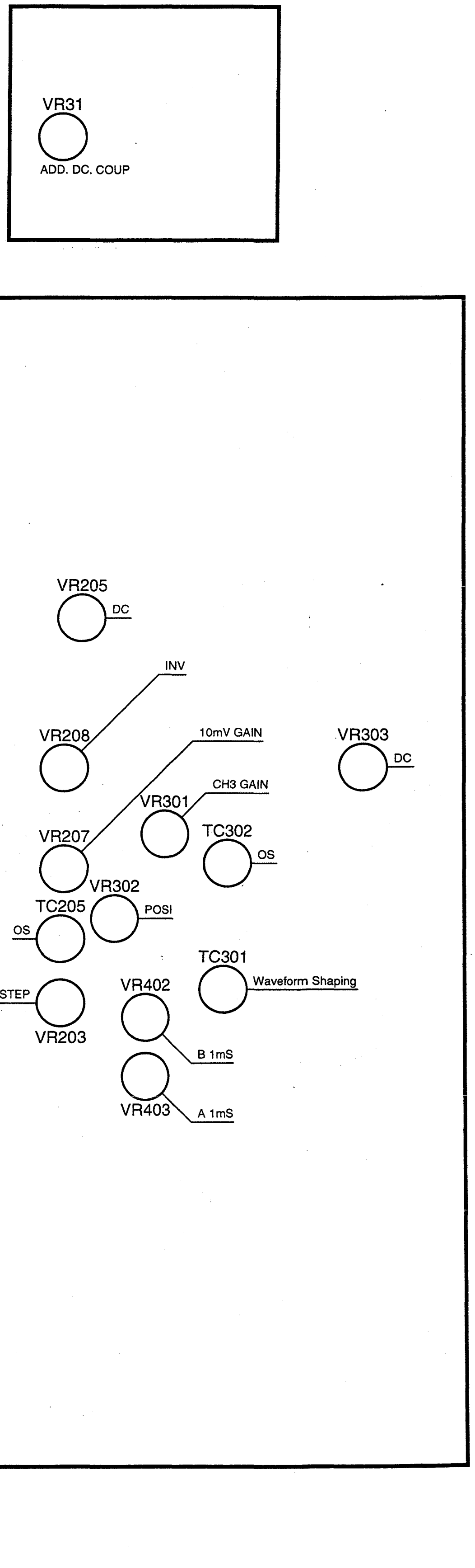
Item	Adjustment	P.C.B.	Procedure
A/B sweep start points	VR102	X74-1580	V.MODE: CH1, AC-DC: DC, SWEEP TIME: A → 1 ms, B → 0.1 ms, H.DISP: ALT DTM: MIN. (Fully counterclockwise) 1) Adjust so that the start points of A.SWEEP and B.SWEEP are aligned. 
A, B SWEEP TIME 1 ms * In case the R/O unit is not used, adjust VR304 alternately so that the total number of marker peals is 12.	VR403 (A, SWEEP) VR402 (B, SWEEP)	X73-2070	SWEEP TIME: A, B → 1 ms, H.DISP: ALT, DTM: MIN (fully counterclockwise). 1) Input a 1 ms marker signal. 2) Adjust so that the marker peak and scale coincides at every div. 
MAG GAIN	VR302	X74-1580	SWEEP TIME: A → 1 ms, H.DISP: A, AC-DC: DC. 1) Input a 1 ms marker signal. 2) Adjust H.POSI so that the marker peak and scale coincides at every div. 3) Switch X10 MAG ON and adjust so that the interval between two peaks is 10 div. 
MAG Center	VR309	X74-1580	SWEEP TIME: A → 1 ms, H.DISP: A, AC-DC: DC. 1) Input a 5 ms marker signal. 2) Adjust H.POSI so that the center peak is aligned with the scale center. 3) Switch X10 MAG ON and adjust so that the center marker peak is aligned with the scale center. (Adjust by repeating a few times.) 4) After the adjustment, switch MAG between ON-OFF and ensure that the center marker peak does not move. 

ADJUSTMENT

Item	Adjustment	P.C.B.	Procedure
H. POSITION X-POSITION * In case the R/O unit is not used. Adjust X-GAIN after H.POSI. (Adjustment sequence) 1) H.POSI 2) X-GAIN 3) X-POSI	VR301 (H.POSI) VR307 (X-POSI)	X74-1580	SWEEP TIME: A → 1 ms, H.DISP: A 1) Set the AC-DC switch to GND. (The marker signal can be left input.) 2) Set H.POSI to the 12:00 position. 3) Adjust VR301 so that the trace start point is aligned with the left end of scale. 4) Set H.DISP to X-Y. 5) Adjust VR307 so that the spot comes on the scale center.
A, B SWEEP TIME 1 µs	TC101 (A, SWEEP) TC102 (B, SWEEP)	X74-1580	SWEEP TIME: A, B → 1 µs, H.DISP: ALT, DTM: MIN (fully counterclockwise). 1) Input a 1 µs marker signal. 2) Adjust so that the marker peak and scale coincides at every div.
A, SWEEP TIME 0.1 µs	TC303 (A, SWEEP)	X74-1580	SWEEP TIME: A, B → 0.1 µs, H.DISP: ALT, DTM: MIN (fully counterclockwise). 1) Input a 50 ns marker signal. 2) Adjust so that the marker peak and scale coincides at every div.
D.T. POSI * In case the R/O unit is not used: 1. Turn the MAIN and FINE potentiometers fully counterclockwise. 2. Align the of B sweep with 0.2 div. 3. Turn the MAIN and FINE potentiometers fully clockwise. 4. Align the start of B sweep with 10 div. The potentiometers used in the start and stop adjustments are the same.	VR103 (Start) VR104 (Stop)	X74-1580	H.DISP: ALT, AC-DC: GND, A.SWEEP: 1 ms, B.SWEEP: 10 µs 1) Turn the MAIN and FINE potentiometers of D.T.M. control fully counterclockwise. 2) Adjust the R/O display to 0.40 ms with FINE. 3) Adjust VR103 so that the start of B sweep is aligned with 0.4 div., of the scale. 4) Turn the MAIN and FINE potentiometers of D.T.M. control fully clockwise. 5) Adjust the R/O display to 10.00 ms with FINE. 6) Adjust VR104 so that the start of B sweep is aligned with 10.00 div., of the scale. 
CH1 1 MHz square wave	TC1 TC62 TC105	X80-1370 X73-2070	V.MODE: CH1, VOLTS: 10 mV, AC-DC: DC H.DISP: A. 1) Input a 1 MHz square wave to CH1 and set its amplitude to 6 div. 2) Adjust the waveform to the best point. * With the 100 MHz band, provide an overshoot of 0.3 to 0.4 div. * With the 60 MHz band, provide an overshoot of 0.1 to 0.2 div. * With the 40 MHz band, provide an overshoot of 0.1 to 0.2 div. Specification: (Above) 0.5, (Below) 0.5, (Above + Below) = Less than 0.7 div.
CH2 1 MHz square wave	TC205 TC206	X73-2070	V.MODE: CH2, VOLTS: 10 mV, AC-DC: DC H.DISP: A. 1) Input a 1 MHz square wave to CH2 and set its amplitude to 6 div. 2) Adjust the waveform to the best point. 3) Check that the overshoot in each range from 5 mV to 0.1 V is within the specification. (Check both CHs.) * Provide overshoot in the same way as CH1. Specification: Same as CH1.
CH3 1 MHz square wave	TC302	X73-2070	V.MODE: CH3, H.DISP: A. 1) Input a 1 MHz square wave to CH3 and set its amplitude to 6 div. 2) Adjust the waveform to the best point.

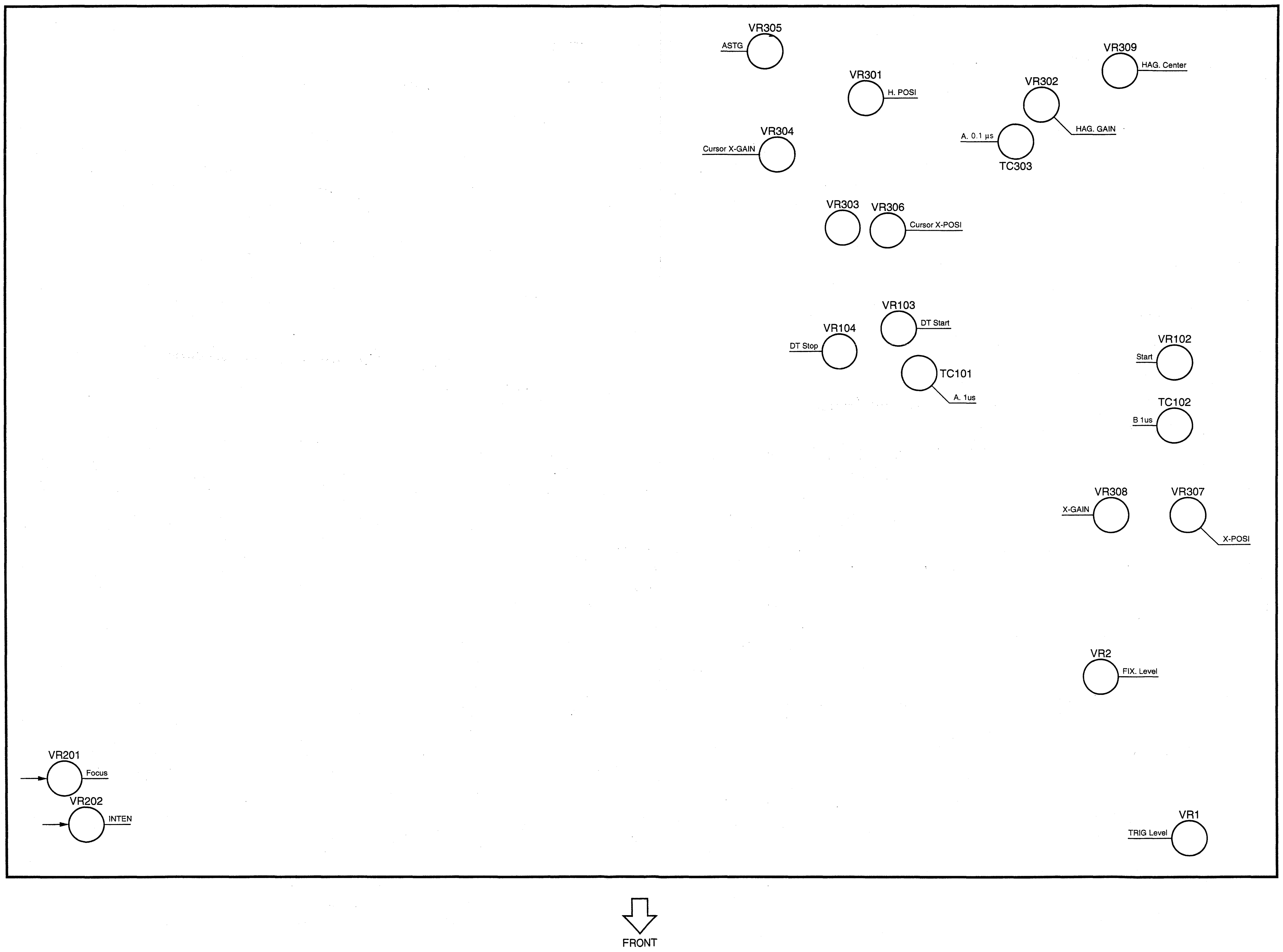
ADJUSTMENT

VERTICAL UNIT (X73-2070-0X)

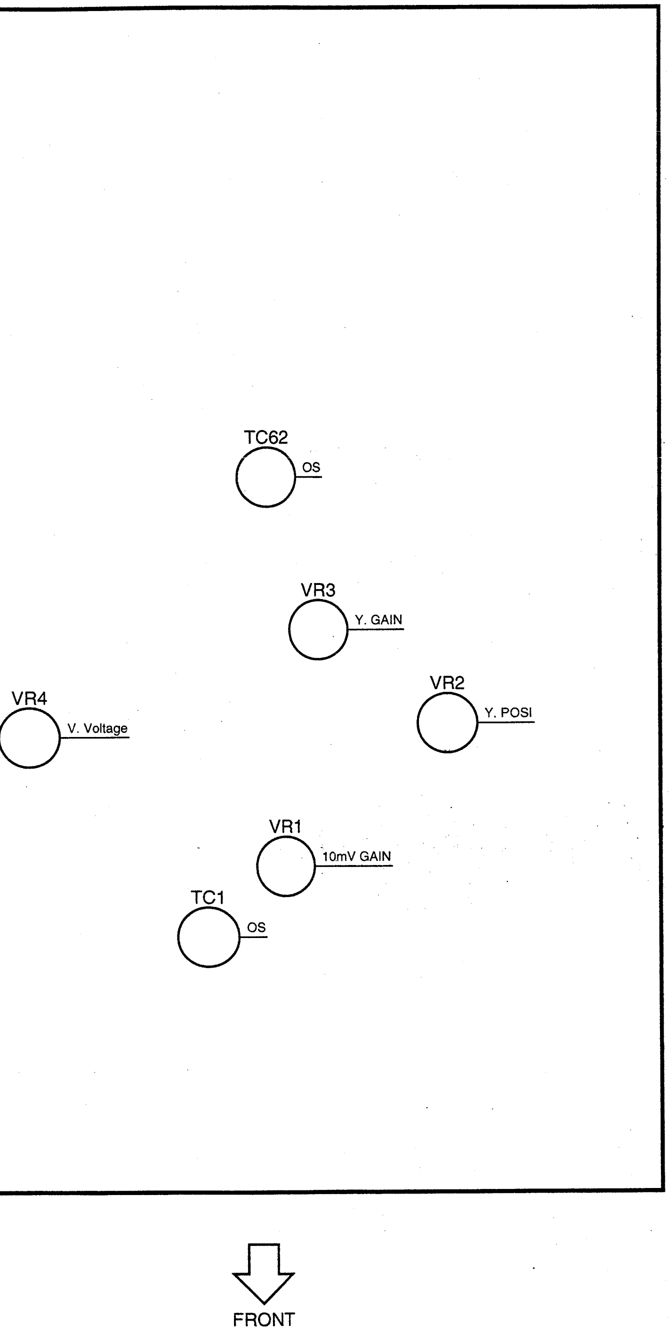

VR31
ADD. DC. COUP
VR1
ADD POSI
VR206
POSI
TC206
OS
VR106
POSI
VR105
DC
VR205
DC
INV
VR208
10mV GAIN
VR303
DC
VR104
VARI
VR204
VARI
CH3 GAIN
VR301
TC302
OS
VR207
VR102
1mV GAIN
VR202
1mV GAIN
VR302
POSI
TC105
OS
TC205
OS
TC301
Waveform Shaping
STEP
VR103
STEP
VR203
VR402
B 1mS
VR403
A 1mS
TC104
TC102
TC204
TC203
TC103
TC101
TC202
TC201
FRONT

ADJUSTMENT

1580-0X)


VR305
ASTG
VR309
HAG. Center
VR301
H. POSI
VR302
HAG. GAIN
VR304
Cursor X-GAIN
A. 0.1 μs
TC303
VR303
VR306
Cursor X-POSI
VR103
DT Start
VR104
DT Stop
TC101
A. 1us
VR102
Start
TC102
B 1us
VR308
X-GAIN
VR307
X-POSI
VR2
FIX. Level
VR201
Focus
VR202
INTEN
VR1
TRIG Level
FRONT

ADJUSTMENT



TROUBLESHOOTING

When operating the CS-5200, be sure to use the proper procedure and check all panel settings.
A wrong setting cause abnormal operation from even a good product. For example, observation of a waveform with high noise components is accompanied by jitter. In such a case, the jitter can be corrected by setting the trigger coupling to HFrej.
If there is any function which you do not understand, check out by reading the instruction manual.
If the operation is abnormal even when the operating procedure is correct, remove the top case and bottom panel.

CAUTION

HIGH VOLTAGE PARTS ARE INSIDE THE EQUIPMENT. THEY ARE EXTREMELY DANGEROUS.

Check all PC boards to ensure that there is no unplugged connector or soldering defect.
Some problems may be corrected by applying correct adjustment. For example, if the trace moves up and down when the Vertical Variable control is turned, it can be corrected by adjusting the Variable balance. For the adjustment methods, read the descriptions of adjustment procedures.
The description in the troubleshooting section use the same circuit names as those used in the block diagram. Refer to the block diagram when reading the troubleshooting.

First, start with checking the power supply block.
Check the voltages at U401 on X74-158.

pin no.	voltage
1	+140
4	+55
6	+12
8	–12
10	+5
11	–8

OK (Acceptable): Go to next step.
NG (Unacceptable): There is a problem in the power supply block. Check the regulator circuit

a: In case no spot is displayed on the CRT in the X-Y mode.
Check that voltages at pins 1 and 4 of P7 on the X74-1580.
OK: Check the voltages at pins 1 and 3 of P5 on the X80-1370.
  OK: There is a problem in the BLK amp. (Go to b.)
  NG: There is a problem in the vertical amp. (Go to i.)
NG: There is a problem in the horizontal amp. (Go to c.)

b: Check if the voltage at JW18 on X74-1580 is correct.
OK: There is a problem in the BLK amp.
NG: There is a problem in the HIGH Volts converter.

c: Short-circuit the bases of Q306 and Q307 on X74-1580.
A spot is displayed on the CRT:
  There is a problem somewhere before the X amp. (Go to d.)
Nothing is displayed on the CRT:
  Short the collectors of Q310 and Q311.
A spot is displayed on the CRT:
  There is a problem in the MAG amp or R/O SW.
Nothing is displayed on the CRT:
  There is a problem in H-FINAL.

d: Short-circuit the collector of Q151 on X74-1580 with the chassis.
A spot is displayed on the CRT:
  There is a problem in the Vertical block.
Nothing is displayed on the CRT:
  There is a problem in the X amp.

e: In case no trace is displayed on the CRT in the A sweep mode.
Measure the waveform at pin 12 of U102 on X74-1580.
OK: Measure every waveform after U102 to locate the defective position.
NG: Measure the A SWEEP GATE, A SWEEP, A SWEEP STOP and HOLD OFF waveforms to locate the defective position.

f: In case no trace is displayed on the CRT in the B sweep mode.
Measure the waveform at pin 12 of U105 on X74-1580.
OK: Measure every waveform after U105 to locate the defective position.
NG: Measure the B SWEEP GATE, B SWEEP, B SWEEP STOP and DTP circuit waveforms to locate the defective position.

g: Intensity is not modulated in ALT sweep mode.
Check the waveform at the collector of Q116 on X74-1580.
OK: There is a problem in INTEN.
NG: There is a problem in the BLK amp.

h: Triggering cannot be applied.
Check the waveform at the collector of Q151 on the X74-1580.
OK: Check the waveform at the collector of Q158 on X74-1580.
  OK: There is a problem in the Schmitt circuit.
  NG: There is a problem in the Trig. Coup.
NG: There is a problem in the trigger selector.

TROUBLESHOOTING

i: Trace is not displayed.

Short-circuit the bases of Q7 and Q8 on X80-1370 and check if a trace is displayed on or near the center.

OK: Short-circuit the bases of Q1 and Q2 on X80-1370 and check if a trace is displayed on o near the center.

OK: There is a problem in X73-2070. Check the defective point by shorting each signal line.

NG: There is a problem in the T.SEP amp or R/O SW on X80-1370.

NG: There is a problem in V. FINAL.

j: TV synchronization is impossible.

Check the waveforms of the video amp on X74-1580.

OK: There is a problem in the Schmitt circuit.

NG: There is a problem in the circuitry before the video amp. Check the defective position following the signal flow. Be sure to check both TV-H and TV-V.

k: The channels are not displayed properly.

Check the outputs from V-MODE LOGIC on X73-2070.

OK: There is a problem in the circuitry before the POSI amp of one of the channels. Check the waveforms.

NG: Check the V-CLK waveform.

OK: There is a problem in the V-MODE LOGIC.

NG: There is a problem in the H-MODE LOGIC on X74-1580.

l: ADD is not possible.

There is a problem in the delay line driver on X73-2070.

m: CHOP sweep is not possible.

Check the waveform at the collector of Q118 on X74-1580.

OK: There is a problem in the H-MODE LOGIC.

NG: There is problem in the CHOP generator.

n: Auto free-run is not possible.

Check +5 V at pin 1 of U106 on X74-1580.

OK: There is a problem in the A sweep gate.

NG: There is a problem in the free-run circuit.

o: Characters are not displayed on the CRT.

- Check the CURSOR MODE SW and R/O INTEN.
- Check the blanking signals at P24-1, 3 and 5.

OK: Check the signals at ROX at P24-8 and ROY at P24-7.

If NG, go to the next check item. If OK, check V FINAL or H FINAL.

NG: There is a problem in the blanking circuitry. (Check U15, U14, U5 and X2 and their surroundings.)

p: Character are not displayed properly on the CRT:

- Check if the CPU (U1) operates normally. (Check the conditions of X1, 10 MHz, U1, data bus and address bus.)
- Trace ROX from the input to output to find if there is any abnormal position. Also check ROY from the input to output. (Check U7, U9, U11, U13, U8, U10 and U12 and their surroundings.)

OK: There is a problem in V FINAL or H FINAL.

NG: There is a problem in the ROX or ROY output circuits.

q: Character data is not displayed properly on the CRT.

- Trace the character data input circuit and its surroundings to fine if there is any abnormal position. (Check U3, U5 and U17.)

OK: There is a problem in the Panel unit.

NG: There is a problem in the character data input circuit.

r: The cursor and DTP do not function properly.

- Check if the cursor and DTP voltages are output properly.

	↻	↺	CHECK POINT
Δ	0V	4V	P23-8
ΔREF	0V	4V	P23-14
DTP	4V	0V	P23-18

OK: There is a problem in the ROX or ROY output circuit.

NG: There is a problem in the Panel unit.

s: Abnormality occurs with other function than above.

Trace the signal path of the defective function referring to the block diagram to locate the defective position.

When all of the troubles have been repaired above, start re-adjustments following the adjustment procedures.

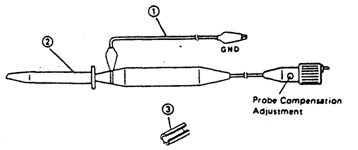
PARTS LIST

CS-5230

Y70-1940-00

REF.NO	PARTS NO	NAME & DESCRIPTION
	A63-0109-03	PANEL ASS'Y
	B41-0710-14	CAUTION LABEL,HIGH VOLTAGE
	B42-3820-05	LABEL;CARTON BOX
	B63-0218-20	INSTRUCTION MANUAL;JAPANESE
	B63-0219-30	INSTRUCTION MANUAL;ENGLISH
	E30-1929-05	BS POWER CORD
	E30-1950-05	JIS POWER CORD
	E30-1951-05	UL/CSA POWER CORD
	E30-1952-05	CEE POWER CORD
	F51-0031-05	FUSE(6X30MM) 630MA/250V
	F51-0033-05	FUSE(6X30MM) 1A/250V
	H10-2883-02	FORMED STYRENE PAD,FRONT
	H10-2884-02	FORMED STYRENE PAD,REAR
	H20-1727-04	VINYL COVER
	H53-0150-04	CARTON BOX
	W01-0406-14	ADJUTMENT ROD
D1	LN322GP	LED;GREEN
D103	LN322GP	LED;GREEN
1	A01-4017-02	CASE,TOP
2	A01-4018-02	CASE,BOTTOM
3	A13-2205-02	FRAME,LEFT
4	A13-2206-02	FRAME,RIGHT
5	A13-2207-12	FRAME,CENTER
6	A21-2421-03	DECORATIVE PANEL,LARGE
7	A21-2425-04	DECORATIVE PANEL,SMALL
8	A22-1307-02	SUB PANEL
9	A63-0110-01	MOLD PANEL,LARGE
10	A63-0111-02	MOLD PANEL,SMALL
11	A83-0067-02	REAR PANEL
12	B11-0518-04	FILTER
13	B41-2069-04	CAUTION LABEL
14	B73-0084-04	NAME PLATE;MODEL NO.
15	D21-0935-04	EXTENSION SHAFT
16	E18-0365-05	AC SELECTOR WITH 6X30MM FUSE
17	E21-0686-04	TERMINAL,CAL
18	E23-0552-04	EARTH TERMINAL
20	F11-1206-13	SHIELD CASE,CRT
21	F11-1269-03	SHIELD CASE
22	F15-0733-04	FELT (CRT SHIELD)
23	F20-3013-03	INSULATOR,LARGE
24	F20-3014-04	INSULATOR,SMALL
25	F29-0528-05	INSULATOR TUBE
26	J02-0089-05	RUBBER FOOT
27	J02-0509-04	TILT STAND
28	J19-1622-05	CORD CLAMP
29	J19-1653-23	HOLDER FOR CRT
30	J21-2573-04	HOLDER FOR LEG
31	J21-4853-04	BRACKET,FRONT
32	J21-4854-04	BRACKET,REAR
33	J21-4855-04	BRACKET
34	J42-0558-05	BUSHING
35	J59-0403-05	NYLON RIVET (ILLUMI)
36	K01-0541-05	HANDLE
37	K21-0919-04	KNOB;5 USED
38	K21-0920-04	KNOB;VARI
39	K21-0940-04	KNOB;A SWP
40	K23-0818-04	KNOB;V/DIV
41	K24-3005-04	PUSH SW;POWER
42	K27-0590-04	PUSH BUTTON;GRAYWHITE
43	K27-3618-14	LEVER
44	K29-0877-04	KNOB;VR
45	L07-1509-05	POWER TRANSFORMER
46	L39-0531-05	ROTATION COIL
47	S40-2532-05	POWER SW
48	W01-0503-04	REAR RUBBER FOOT/CORD WRAP
49	X66-1400-00	PANEL UNIT
50	X73-2070-00	VERTICAL UNIT
51	X74-1580-00	HORIZONTAL UNIT
52	X77-1870-00	R/O UNIT
53	X80-1370-00	FINAL AMP UNIT
54	X81-3270-00	DELAY LINE UNIT
55	150VTM31A	CRT

MODEL PC-33 (LOW CAPACITY PROBE)



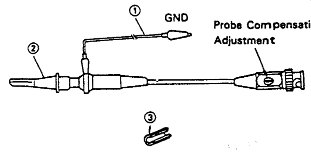
ITEM	DESCRIPTION	PARTS NO.
①	Ground Wire Assembly	E30-1883-08
②	Retractable Hook Tip	E29-0540-08
③	Marker (Orange)	B42-1950-08

CS-5235

X70-1950-00

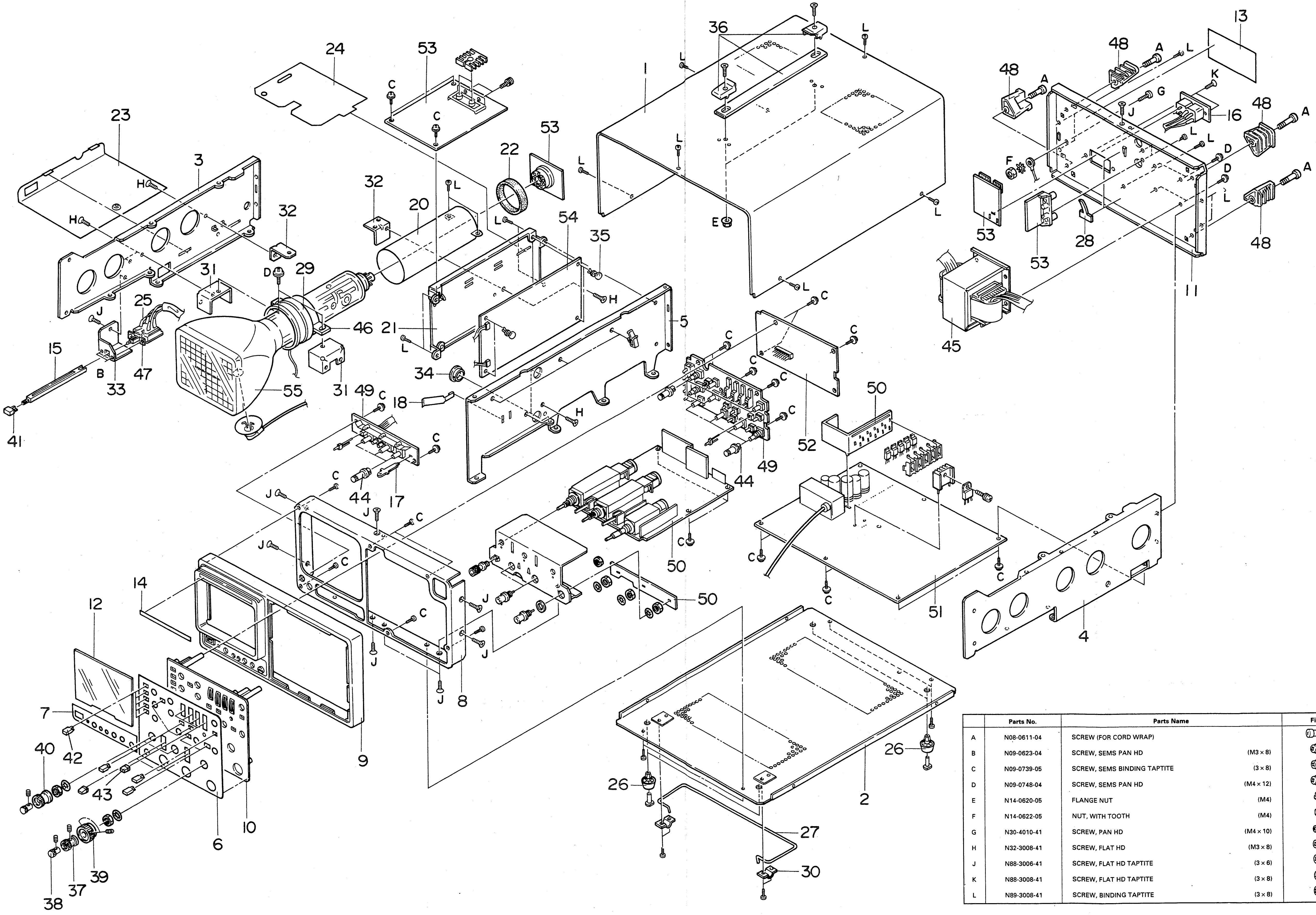
REF.NO	PARTS NO	NAME & DESCRIPTION
	A63-0164-03	PANEL ASS'Y
	B41-0710-14	CAUTION LABEL,HIGH VOLTAGE
	B42-3820-05	LABEL;CARTON BOX
	B63-0218-20	INSTRUCTION MANUAL;JAPANESE
	B63-0219-30	INSTRUCTION MANUAL;ENGLISH
	E30-1929-05	BS POWER CORD
	E30-1950-05	JIS POWER CORD
	E30-1951-05	UL/CSA POWER CORD
	E30-1952-05	CEE POWER CORD
	F51-0031-05	FUSE(6X30MM) 630MA/250V
	F51-0033-05	FUSE(6X30MM) 1A/250V
	H10-2883-02	FORMED STYRENE PAD,FRONT
	H10-2884-02	FORMED STYRENE PAD,REAR
	H20-1727-04	VINYL COVER
	H53-0151-04	CARTON BOX
	W01-0406-14	ADJUTMENT ROD
D1	LN322GP	LED;GREEN
D103	LN322GP	LED;GREEN
1	A01-4017-02	CASE,TOP
2	A01-4018-02	CASE,BOTTOM
3	A13-2205-02	FRAME,LEFT
4	A13-2206-02	FRAME,RIGHT
5	A13-2207-12	FRAME,CENTER
6	A21-2422-03	DECORATIVE PANEL,LARGE
7	A21-2426-04	DECORATIVE PANEL,SMALL
8	A22-1307-02	SUB PANEL
9	A63-0110-01	MOLD PANEL,LARGE
10	A63-0111-02	MOLD PANEL,SMALL
11	A83-0067-02	REAR PANEL
12	B11-0518-04	FILTER
13	B41-2069-04	CAUTION LABEL
14	B73-0085-04	NAME PLATE;MODEL NO.
15	D21-0935-04	EXTENSION SHAFT
16	E18-0365-05	AC SELECTOR WITH 6X30MM FUSE
17	E21-0686-04	TERMINAL,CAL
18	E23-0552-04	EARTH TERMINAL
20	F11-1206-13	SHIELD CASE,CRT
21	F11-1269-03	SHIELD CASE
22	F15-0733-04	FELT (CRT SHIELD)
23	F20-3013-03	INSULATOR,LARGE
24	F20-3014-04	INSULATOR,SMALL
25	F29-0528-05	INSULATOR TUBE
26	J02-0089-05	RUBBER FOOT
27	J02-0509-04	TILT STAND
28	J19-1622-05	CORD CLAMP
29	J19-1653-23	HOLDER FOR CRT
30	J21-2573-04	HOLDER FOR LEG
31	J21-4853-04	BRACKET,FRONT
32	J21-4854-04	BRACKET,REAR
33	J21-4855-04	BRACKET
34	J42-0558-05	BUSHING
35	J59-0403-05	NYLON RIVET (ILLUMI)
36	K01-0541-05	HANDLE
37	K21-0919-04	KNOB;5 USED
38	K21-0920-04	KNOB;VARI
39	K21-0940-04	KNOB;A SWP
40	K23-0818-04	KNOB;V/DIV
41	K24-3005-04	PUSH SW;POWER
42	K27-0590-04	PUSH BUTTON;GRAYWHITE
43	K27-3618-14	LEVER
44	K29-0877-04	KNOB;VR
45	L07-1509-05	POWER TRANSFORMER
45	W01-0503-04	REAR RUBBER FOOT/CORD WRAP
46	L39-0531-05	ROTATION COIL
47	S40-2532-05	POWER SW
49	X66-1400-01	PANEL UNIT
50	X73-2070-01	VERTICAL UNIT
51	X74-1580-01	HORIZONTAL UNIT
53	X80-1370-01	FINAL AMP UNIT
54	X81-3270-00	DELAY LINE UNIT
55	150VTM31A	CRT

MODEL PC-35 (LOW CAPACITY PROBE)



ITEM	DESCRIPTION	PARTS NO.
①	Ground Wire Assembly	E30-1883-08
②	Retractable Hook Tip	E29-0540-08
③	Marker (Orange)	B42-1950-08

DISASSEMBLY



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	Parts No.	Parts Name		Figure
A	N08-0611-04	SCREW (FOR CORD WRAP)		
B	N09-0623-04	SCREW, SEMS PAN HD	(M3 × 8)	
C	N09-0739-05	SCREW, SEMS BINDING TAPTITE	(3 × 8)	
D	N09-0748-04	SCREW, SEMS PAN HD	(M4 × 12)	
E	N14-0620-05	FLANGE NUT	(M4)	
F	N14-0622-05	NUT, WITH TOOTH	(M4)	
G	N30-4010-41	SCREW, PAN HD	(M4 × 10)	
H	N32-3008-41	SCREW, FLAT HD	(M3 × 8)	
J	N88-3006-41	SCREW, FLAT HD TAPTITE	(3 × 6)	
K	N88-3008-41	SCREW, FLAT HD TAPTITE	(3 × 8)	
L	N89-3008-41	SCREW, BINDING TAPTITE	(3 × 8)	

PARTS LIST

CS-5230 PANEL UNIT

Y66-1400-00

REF.NO	PARTS NO	NAME & DESCRIPTION			
	A33-0505-04	REFLECTOR			
	E38-0994-15	WIRE ASS'Y			
	E38-0995-15	WIRE ASS'Y			
	J73-0287-02	PCB (UNMOUNTED)			
C1	CE04LW1A221M	CAP. ELECTRO	220	20%	10V
C2	CE04LW1E101M	CAP. ELECTRO	100	20%	25V
C3	CE04LW1E101M	CAP. ELECTRO	100	20%	25V
C101	C90-3228-05	CAP. ELECTRO	47	20%	16V
C102	C90-3228-05	CAP. ELECTRO	47	20%	16V
C103	CF92FV1H103J	CAP. POLYESTER	0.01	5%	50V
C104	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C105	C90-3228-05	CAP. ELECTRO	47	20%	16V
C801	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
D2	1SS132	DIODE			
D101	1SS132	DIODE			
D102	1SS132	DIODE			
JW11	E38-0992-25	WIRE ASS'Y			
JW12	E38-0993-25	WIRE ASS'Y			
JW17	E38-0996-15	WIRE ASS'Y			
L1	L40-3391-17	FERRI INDUCTOR	3.3UH	10%	
L2	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
L3	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
L4	L40-3391-17	FERRI INDUCTOR	3.3UH	10%	
L5	L40-3391-17	FERRI INDUCTOR	3.3UH	10%	
L6	L40-3391-17	FERRI INDUCTOR	3.3UH	10%	
L7	L40-3391-17	FERRI INDUCTOR	3.3UH	10%	
L8	L40-3391-17	FERRI INDUCTOR	3.3UH	10%	
L9	L40-3391-17	FERRI INDUCTOR	3.3UH	10%	
L10	L40-3391-17	FERRI INDUCTOR	3.3UH	10%	
P15	E40-5067-05	PIN CONNECTOR	10P		
P16	E40-5069-05	PIN CONNECTOR	12P		
P23	E40-7411-05	PIN CONNECTOR	26P		
P26	E40-0218-05	PIN CONNECTOR	2P		
P27	E40-0218-05	PIN CONNECTOR	2P		
PL101	B30-3016-05	LAMP			
PL102	B30-3016-05	LAMP			
PL103	B30-3016-05	LAMP			
Q1	2SC1740S(R,S)	TR. SI, NPN			
Q2	2SC1740S(R,S)	TR. SI, NPN			
Q3	2SA933S(R,S)	TR. SI, PNP			
Q101	2SC1740S(R,S)	TR. SI, NPN			
Q102	2SC1740S(R,S)	TR. SI, NPN			
Q103	2SC1318A(R)	TR. SI, NPN			
Q104	2SA720A(R)	TR. SI, PNP			
R1	R90-1182-05	RES. NETWORK			
R2	R90-1182-05	RES. NETWORK			
R3	R90-1182-05	RES. NETWORK			
R4	R90-1182-05	RES. NETWORK			
R5	RN14BK2C1002D	RES. METAL FILM	10K	0.5%	1/6W
R6	RN14BK2C2002D	RES. METAL FILM	20K	0.5%	1/6W
R7	R92-1061-05	JUMPING RES.	ZERO OHM(5MM)		
R8	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R9	RN14BK2C2203F	RES. METAL FILM	220K	1%	1/6W
R10	RN14BK2C2202F	RES. METAL FILM	22K	1%	1/6W
R11	RN14BK2C2002D	RES. METAL FILM	20K	0.5%	1/6W
R12	RN14BK2C2002D	RES. METAL FILM	20K	0.5%	1/6W
R13	RD14BB2C361J	RES. CARBON	360	5%	1/6W
R14	RN14BK2C1962D	RES. METAL FILM	19.6K	0.5%	1/6W
R15	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R16	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R17	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R18	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R19	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R20	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R21	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R22	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R23	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R24	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R25	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R26	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R27	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R28	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R29	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R30	RD14BB2C330J	RES. CARBON	33	5%	1/6W
R31	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R32	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R33	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R34	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R35	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R36	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R37	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R38	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R39	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R40	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R41	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R42	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R43	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R44	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R45	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R46	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R47	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R48	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R49	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R50	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R101	RN14BK2C5102F	RES. METAL FILM	51K	1%	1/6W
R102	RN14BK2C3902F	RES. METAL FILM	39K	1%	1/6W
R103	RN14BK2C3902F	RES. METAL FILM	39K	1%	1/6W
R104	RN14BK2C4702F	RES. METAL FILM	47K	1%	1/6W
R105	RN14BK2C4702F	RES. METAL FILM	47K	1%	1/6W
R106	RD14BB2C183J	RES. CARBON	18K	5%	1/6W
R107	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R108	NO USE				
R109	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R110	RN14BK2C6801F	RES. METAL FILM	6.8K	1%	1/6W
R111	RD14BB2C241J	RES. CARBON	240	5%	1/6W
R112	RN14BK2C6800F	RES. METAL FILM	680	1%	1/6W
R113	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R114	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R115	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R116	RD14BB2C182J	RES. CARBON	1.8K	5%	1/6W
R117	RD14BB2C123J	RES. CARBON	12K	5%	1/6W
R118	RD14BB2C163J	RES. CARBON	16K	5%	1/6W
R119	RD14BB2C123J	RES. CARBON	12K	5%	1/6W
R120	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
S1	S40-1532-05	PUSH SWITCH			
S2	S40-1532-05	PUSH SWITCH			
S3	S40-1532-05	PUSH SWITCH			
S4	S40-1532-05	PUSH SWITCH			
S5	S40-1532-05	PUSH SWITCH			
S6	S40-1532-05	PUSH SWITCH			
S7	S64-0605-05	LEVER SWITCH			
S8	S64-0605-05	LEVER SWITCH			
S9	S64-0606-05	LEVER SWITCH			
S10	S64-0604-05	LEVER SWITCH			
S11	S40-1532-05	PUSH SWITCH			
S12	S40-1532-05	PUSH SWITCH			
S13	S40-1532-05	PUSH SWITCH			
S14	S40-1532-05	PUSH SWITCH			
S15	S40-7411-05	PUSH SWITCH			
U1	NJM4558L	IC,DUAL OP AMP			
U101	NJM4558L	IC,DUAL OP AMP			
VR1	R05-3521-05	V.R.	20KB		
VR2	R05-3521-05	V.R.	20KB		
VR3	R05-3521-05	V.R.	20KB		
VR4	R05-3521-05	V.R.	20KB		
VR5	R05-3521-05	V.R.	20KB		
VR6	R05-3527-05	V.R.	20KB		
VR7	R05-3521-05	V.R.	20KB		
VR8	R05-3527-05	V.R.	20KB		
VR9	R05-3527-05	V.R.	20KB		
VR101	R05-3521-05	V.R.	20KB		
VR102	R05-3521-05	V.R.	20KB		
VR103	R12-5540-05	RES. SEMI FIXED	100KB		
VR104	R12-5540-05	RES. SEMI FIXED	100KB		
VR105	R05-3521-05	V.R.	20KB		

PARTS LIST

CS-5235 PANEL UNIT

Y66-1400-01

REF.NO	PARTS NO	NAME & DESCRIPTION			
	A33-0505-04	REFLECTOR			
	E38-0994-15	WIRE ASS'Y			
	E38-0995-15	WIRE ASS'Y			
	J73-0287-02	PCB (UNMOUNTED)			
C1	CE04LW1A221M	CAP. ELECTRO	220	20%	10V
C2	CE04LW1E101M	CAP. ELECTRO	100	20%	25V
C3	CE04LW1E101M	CAP. ELECTRO	100	20%	25V
C101	C90-3228-05	CAP. ELECTRO	47	20%	16V
C102	C90-3228-05	CAP. ELECTRO	47	20%	16V
C103	CF92FV1H103J	CAP. POLYESTER	0.01	5%	50V
C104	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C105	C90-3228-05	CAP. ELECTRO	47	20%	16V
C801	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
D2	1SS132	DIODE			
D101	1SS132	DIODE			
D102	1SS132	DIODE			
JW12	E38-0993-25	WIRE ASS'Y			
JW17	E38-0996-15	WIRE ASS'Y			
L8	R92-1061-05	JUMPING RES.	ZERO OHM(5MM)		
L9	R92-1061-05	JUMPING RES.	ZERO OHM(5MM)		
L10	R92-1061-05	JUMPING RES.	ZERO OHM(5MM)		
P15	E40-5067-05	PIN CONNECTOR	10P		
P16	E40-5069-05	PIN CONNECTOR	12P		
P26	E40-0218-05	PIN CONNECTOR	2P		
P27	E40-0218-05	PIN CONNECTOR	2P		
PL101	B30-3016-05	LAMP			
PL102	B30-3016-05	LAMP			
PL103	B30-3016-05	LAMP			
Q1	2SC1740S(R,S)	TR. SI, NPN			
Q2	2SC1740S(R,S)	TR. SI, NPN			
Q3	2SA933S(R,S)	TR. SI, PNP			
Q101	2SC1740S(R,S)	TR. SI, NPN			
Q102	2SC1740S(R,S)	TR. SI, NPN			
Q103	2SC1318A(R)	TR. SI, NPN			
Q104	2SA720A(R)	TR. SI, PNP			
R1	R90-1182-05	RES. NETWORK			
R2	R90-1182-05	RES. NETWORK			
R3	R90-1182-05	RES. NETWORK			
R4	R90-1182-05	RES. NETWORK			
R5	RN14BK2C1002D	RES. METAL FILM	10K	0.5%	1/6W
R6	RN14BK2C2002D	RES. METAL FILM	20K	0.5%	1/6W
R7	R92-1061-05	JUMPING RES.	ZERO OHM(5MM)		
R8	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R9	RN14BK2C2203F	RES. METAL FILM	220K	1%	1/6W
R10	RN14BK2C2202F	RES. METAL FILM	22K	1%	1/6W
R11	RN14BK2C2002D	RES. METAL FILM	20K	0.5%	1/6W
R12	RN14BK2C2002D	RES. METAL FILM	20K	0.5%	1/6W
R13	RD14BB2C361J	RES. CARBON	360	5%	1/6W
R14	RN14BK2C1962D	RES. METAL FILM	19.6K	0.5%	1/6W
R15	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R16	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R17	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R18	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R19	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R20	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R21	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R22	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R23	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R24	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R25	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R26	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R27	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R28	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R29	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R30	RD14BB2C330J	RES. CARBON	33	5%	1/6W
R31	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R32	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R33	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R34	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R35	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R36	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R37	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R38	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R39	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R40	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R41	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R42	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R43	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R46	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R47	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R48	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R49	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R50	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R101	RN14BK2C5102F	RES. METAL FILM	51K	1%	1/6W
R102	RN14BK2C3902F	RES. METAL FILM	39K	1%	1/6W
R103	RN14BK2C3902F	RES. METAL FILM	39K	1%	1/6W
R104	RN14BK2C4702F	RES. METAL FILM	47K	1%	1/6W
R105	RN14BK2C4702F	RES. METAL FILM	47K	1%	1/6W
R106	RD14BB2C183J	RES. CARBON	18K	5%	1/6W
R107	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R108	NO USE				
R109	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R110	RN14BK2C6801F	RES. METAL FILM	6.8K	1%	1/6W
R111	RD14BB2C241J	RES. CARBON	240	5%	1/6W
R112	RN14BK2C6800F	RES. METAL FILM	680	1%	1/6W
R113	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R114	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R115	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R116	RD14BB2C182J	RES. CARBON	1.8K	5%	1/6W
R117	NO USE				
R118	RD14BB2C163J	RES. CARBON	16K	5%	1/6W
R119	RD14BB2C123J	RES. CARBON	12K	5%	1/6W
R120	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
S1	S40-1532-05	PUSH SWITCH			
S2	S40-1532-05	PUSH SWITCH			
S3	S40-1532-05	PUSH SWITCH			
S4	S40-1532-05	PUSH SWITCH			
S5	S40-1532-05	PUSH SWITCH			
S6	S40-1532-05	PUSH SWITCH			
S7	S64-0605-05	LEVER SWITCH			
S8	S64-0605-05	LEVER SWITCH			
S9	S64-0606-05	LEVER SWITCH			
S10	S64-0604-05	LEVER SWITCH			
S11	S40-1532-05	PUSH SWITCH			
S12	S40-1532-05	PUSH SWITCH			
S13	S40-1532-05	PUSH SWITCH			
S14	S40-1532-05	PUSH SWITCH			
U1	NJM4558L	IC,DUAL OP AMP			
U101	NJM4558L	IC,DUAL OP AMP			
VR1	R05-3521-05	V.R.	20KB		
VR2	R05-3521-05	V.R.	20KB		
VR3	R05-3521-05	V.R.	20KB		
VR4	R05-3521-05	V.R.	20KB		
VR5	R05-3521-05	V.R.	20KB		
VR6	R05-3527-05	V.R.	20KB		
VR7	R05-3521-05	V.R.	20KB		
VR8	R05-3527-05	V.R.	20KB		
VR9	R05-3527-05	V.R.	20KB		
VR101	R05-3521-05	V.R.	20KB		
VR102	R05-3521-05	V.R.	20KB		
VR103	NO USE				
VR104	R12-5540-05	RES. SEMI FIXED	100KB		
VR105	R05-3521-05	V.R.	20KB		

PARTS LIST

CS-5230 VERTICAL UNIT

X73-2070-00

REF.NO	PARTS NO	NAME & DESCRIPTION			
	A22-1308-03	SUB PANEL			
	E21-0667-05	METAL TERMINAL			
	E23-0149-05	GND TERMINAL			
	F01-2318-04	HEAT SINK			
	F10-1590-14	SHIELD PLATE,ATT			
	F10-1668-04	SHIELD PLATE			
	J30-0623-04	SPACER			
	J73-0283-22	PCB (UNMOUNTED)			
C2	CC45FCH1H101J	CAP. CERAMIC	100P	5%	50V
C7	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C30	C91-0747-05	CAP. CERAMIC	150P	10%	50V
C31	C91-0747-05	CAP. CERAMIC	150P	10%	50V
C32	C91-0748-05	CAP. CERAMIC	180P	10%	50V
C33	C91-2595-05	CAP. CERAMIC	68P	5%	50V
C34	CE04LW0J331M	CAP. ELECTRO	330	20%	6.3V
C35	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C36	C91-0745-05	CAP. CERAMIC	100P	10%	50V
C37	C91-0745-05	CAP. CERAMIC	100P	10%	50V
C38	C91-0745-05	CAP. CERAMIC	100P	10%	50V
C39	CE04CW1C470M	CAP. ELECTRO	47	20%	16V
C40	CE04LW1A470M	CAP. ELECTRO	47	20%	10V
C51	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C52	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C53	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C54	CE04LW1C330M	CAP. ELECTRO	33	20%	16V
C57	CE04HW1C220M	CAP. ELECTRO	22	20%	16V
C58	CC45FCH1H090D	CAP. CERAMIC	9P	0.5P	50V
C59	CE04LW1E470M	CAP. ELECTRO	47	20%	25V
C101	C91-2605-05	CAP. CERAMIC	470P	5%	50V
C102	C91-2580-05	CAP. POLYESTER	0.047	10%	400V
C103	C91-2579-05	CAP. POLYESTER	0.01	10%	400V
C104	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C105	CE04LW1A101M	CAP. ELECTRO	100	20%	10V
C110	CC45FCH1H680J	CAP. CERAMIC	68P	5%	50V
C111	NO USE				
C112	CC45FCH1H100D	CAP. CERAMIC	10P	0.5P	50V
C113	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C114	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C117	CE04CW1C470M	CAP. ELECTRO	47	20%	16V
C118	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C122	CC45FCH1H560J	CAP. CERAMIC	56P	5%	50V
C125	CF92FV1H332J	CAP. POLYESTER	3300P	5%	50V
C201	C91-2603-05	CAP. CERAMIC	330P	5%	50V
C202	C91-2580-05	CAP. POLYESTER	0.047	10%	400V
C203	C91-2579-05	CAP. POLYESTER	0.01	10%	400V
C204	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C205	CE04LW1A101M	CAP. ELECTRO	100	20%	10V
C210	CC45FCH1H680J	CAP. CERAMIC	68P	5%	50V
C211	NO USE				
C212	CC45FCH1H100D	CAP. CERAMIC	10P	0.5P	50V
C213	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C214	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C217	CE04CW1C470M	CAP. ELECTRO	47	20%	16V
C218	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C221	CE04LW1E470M	CAP. ELECTRO	47	20%	25V
C222	CC45FCH1H560J	CAP. CERAMIC	56P	5%	50V
C225	CF92FV1H332J	CAP. POLYESTER	3300P	5%	50V
C301	CC45FCH1H070D	CAP. CERAMIC	7P	0.5P	50V
C302	CC45FCH1H150J	CAP. CERAMIC	15P	5%	50V
C303	CK45FB1H102K	CAP. CERAMIC	1000P	10%	50V
C304	NO USE				
C305	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C306	CC45FCH1H220J	CAP. CERAMIC	22P	5%	50V
C307	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C313	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C314	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C315	NO USE				
C316	CE04EW1E470M	CAP. ELECTRO	47	20%	25V
C319	CE04LW1C470M	CAP. ELECTRO	47	20%	16V
C320	C91-0711-05	CAP. CERAMIC	1.5P	20%	50V
C401	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C402	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C403	CE04LW1C470M	CAP. ELECTRO	47	20%	16V
C404	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C405	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C406	NO USE				
C407	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C410	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C411	NO USE				
C412	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C418	CE04EW1A101M	CAP. ELECTRO	100	20%	10V
C451	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C452	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C901	CK45B1H102K	CAP. CERAMIC	1000P	10%	50V
D2	1SS132	DIODE			
D31	1SS132	DIODE			
D32	1SS132	DIODE			
D35	1SS132	DIODE			
D36	1SS132	DIODE			
D37	1SS132	DIODE			
D101	1SS132	DIODE			
D102	1SS132	DIODE			
D103	1SS132	DIODE			
D104	1SS132	DIODE			
D105	1SS132	DIODE			
D106	1SS132	DIODE			
D107	1SS132	DIODE			
D108	1SS132	DIODE			
D201	1SS132	DIODE			
D202	1SS132	DIODE			
D203	1SS132	DIODE			
D204	1SS132	DIODE			
D205	1SS132	DIODE			
D206	1SS132	DIODE			
D207	1SS132	DIODE			
D208	1SS132	DIODE			
D301	1SS132	DIODE			
D302	1SS132	DIODE			
D303	1SS132	DIODE			
D304	1SS132	DIODE			
D305	1SS132	DIODE			
D306	1SS132	DIODE			
D307	1SS132	DIODE			
D308	1SS132	DIODE			
D309	1SS132	DIODE			
JW6	E38-0985-05	WIRE ASS'Y;V TO H TRG			
JW10	E38-0986-05	WIRE ASS'Y;V TO H SWP			
JW301	E38-0987-15	WIRE ASS'Y;CH3 INPUT			
JW401	E38-0984-15	WIRE ASS'Y;PROBE DETECTION			
JW501	E38-0983-25	WIRE ASS'Y;SUB PANEL TO GND			
L1	L79-0553-05	NOISE FILTER			
L40	L40-2201-17	FERRI INDUCTOR	22UH	10%	
L51	L40-4791-17	FERRI INDUCTOR	4.7UH	10%	
L52	L40-4791-17	FERRI INDUCTOR	4.7UH	10%	
L301	L40-4781-17	FERRI INDUCTOR	0.47UH	10%	
P1	E04-0260-05	BNC RECEPTACLE (READOUT)			
P2	E04-0260-05	BNC RECEPTACLE (READOUT)			
P3	E04-0259-05	BNC RECEPTACLE			
P4	E40-7515-05	PIN CONNECTOR	3P		
P9	E40-7518-05	PIN CONNECTOR	6P		
P10	NO USE				
P11	E40-3242-05	PIN CONNECTOR	7P		
P12	E40-5066-05	PIN CONNECTOR	9P		
P13	E40-7515-05	PIN CONNECTOR	3P		
P201	E40-7432-05	PIN CONNECTOR	13P		
P202	E40-7423-05	PIN CONNECTOR	4P		
P203	E40-7430-05	PIN CONNECTOR	11P		
P204	E40-7426-05	PIN CONNECTOR	7P		
P205	E40-7422-05	PIN CONNECTOR	3P		
P206	E40-7426-05	PIN CONNECTOR	7P		
P207	E40-7432-05	PIN CONNECTOR	13P		
P208	E40-7432-05	PIN CONNECTOR	13P		
Q1	2SC1740S(R,S)	TR. SI, NPN			
Q2	2SC3779(D)	TR. SI, NPN			
Q3	2SC3779(D)	TR. SI, NPN			
Q32	2SC3066(G)	TR. SI, NPN			
Q33	2SC1740S(R,S)	TR. SI, NPN			
Q34	2SA933S(R,S)	TR. SI, PNP			

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
Q51	2SC1923(O)	TR. SI, NPN			
Q101	2SC1923(O)	TR. SI, NPN			
Q102	2SK404(E)	FET, N-CHANNEL			
Q103	2SC1923(O)	TR. SI, NPN			
Q106	2SC3779(D)	TR. SI, NPN			
Q107	2SC3779(D)	TR. SI, NPN			
Q108	2SA1005(K)	TR. SI, PNP			
Q109	2SA1005(K)	TR. SI, PNP			
Q110	2SA1005(K)	TR. SI, PNP			
Q111	2SA1005(K)	TR. SI, PNP			
Q114	2SA1005(K)	TR. SI, PNP			
Q152	2SA1005(K)	TR. SI, PNP			
Q153	2SA1005(K)	TR. SI, PNP			
Q201	2SC1923(O)	TR. SI, NPN			
Q202	2SK404(E)	FET, N-CHANNEL			
Q203	2SC1923(O)	TR. SI, NPN			
Q206	2SC3779(D)	TR. SI, NPN			
Q207	2SC3779(D)	TR. SI, NPN			
Q208	2SA1005(K)	TR. SI, PNP			
Q209	2SA1005(K)	TR. SI, PNP			
Q210	2SA1005(K)	TR. SI, PNP			
Q211	2SA1005(K)	TR. SI, PNP			
Q214	2SA1005(K)	TR. SI, PNP			
Q215	2SC1740S(R,S)	TR. SI, NPN			
Q252	2SA1005(K)	TR. SI, PNP			
Q253	2SA1005(K)	TR. SI, PNP			
Q302	2SC1923(O)	TR. SI, NPN			
Q303	2SK404(E)	FET, N-CHANNEL			
Q304	2SC1923(O)	TR. SI, NPN			
Q305	2SA1005(K)	TR. SI, PNP			
Q306	2SA1005(K)	TR. SI, PNP			
Q307	2SC1923(O)	TR. SI, NPN			
Q308	2SC1923(O)	TR. SI, NPN			
Q309	2SC1923(O)	TR. SI, NPN			
Q310	2SA1005(K)	TR. SI, PNP			
Q311	2SA1005(K)	TR. SI, PNP			
Q312	2SC1923(O)	TR. SI, NPN			
Q313	2SA1005(K)	TR. SI, PNP			
Q314	2SA1005(K)	TR. SI, PNP			
R1	RN14BK2C2002F	RES. METAL FILM	20K	1%	1/6W
R2	RN14BK2C2001F	RES. METAL FILM	2K	1%	1/6W
R3	RN14BK2C2001F	RES. METAL FILM	2K	1%	1/6W
R6	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R7	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R8	RN14BK2C3900F	RES. METAL FILM	390	1%	1/6W
R9	RN14BK2C3900F	RES. METAL FILM	390	1%	1/6W
R10	RN14BK2C7500F	RES. METAL FILM	750	1%	1/6W
R11	RN14BK2C7500F	RES. METAL FILM	750	1%	1/6W
R12	R92-1553-05	RES. SPECIAL POWER	620	5%	1W
R17	RN14BK2C6200F	RES. METAL FILM	620	1%	1/6W
R18	RN14BK2C6200F	RES. METAL FILM	620	1%	1/6W
R19	RN14BK2C39R0F	RES. METAL FILM	39	1%	1/6W
R20	RN14BK2C39R0F	RES. METAL FILM	39	1%	1/6W
R21	NO USE				
R22	RN14BK2C6802F	RES. METAL FILM	68K	1%	1/6W
R31	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R32	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R33	RD14BB2C751J	RES. CARBON	750	5%	1/6W
R34	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R35	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R36	R90-0645-05	RES. NETWORK	4X10K		
R37	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R38	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R39	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R40	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R41	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R42	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R43	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R44	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R45	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R52	RD14BB2C391J	RES. CARBON	390	5%	1/6W
R59	RD14BB2C432J	RES. CARBON	4.3K	5%	1/6W
R62	RD14BB2C301J	RES. CARBON	300	5%	1/6W
R63	RD14BB2C821J	RES. CARBON	820	5%	1/6W
R64	RD14BB2C133J	RES. CARBON	13K	5%	1/6W
R65	RD14BB2C910J	RES. CARBON	91	5%	1/6W
R66	RD14BB2C910J	RES. CARBON	91	5%	1/6W
R67	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R68	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R69	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R70	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R71	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R101	RD14BB2E220J	RES. CARBON	22	5%	1/4W
R102	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R103	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R104	RD14BB2C105J	RES. CARBON	1M	5%	1/6W
R107	RD14BB2C684J	RES. CARBON	680K	5%	1/6W
R108	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R109	RD14BB2C132J	RES. CARBON	1.3K	5%	1/6W
R110	NO USE				
R111	RD14BB2C160J	RES. CARBON	16	5%	1/6W
R112	RN14BK2C2700F	RES. METAL FILM	270	1%	1/6W
R113	NO USE				
R114	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R115	RN14BK2C1301F	RES. METAL FILM	1.3K	1%	1/6W
R116	RN14BK2C1301F	RES. METAL FILM	1.3K	1%	1/6W
R117	RN14BK2C3301F	RES. METAL FILM	3.3K	1%	1/6W
R118	RN14BK2C2401F	RES. METAL FILM	2.4K	1%	1/6W
R119	RN14BK2C5100F	RES. METAL FILM	510	1%	1/6W
R120	RD14BB2C301J	RES. CARBON	300	5%	1/6W
R121	RN14BK2C1004F	RES. METAL FILM	1M	1%	1/6W
R122	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R123	RD14BB2C331J	RES. CARBON	330	5%	1/6W
R124	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R125	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R126	RD14BB2C273J	RES. CARBON	27K	5%	1/6W
R127	RD14BB2C163J	RES. CARBON	16K	5%	1/6W
R128	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R129	NO USE				
R130	RD14BB2C823J	RES. CARBON	82K	5%	1/6W
R131	NO USE				
R132	RN14BK2C4701F	RES. METAL FILM	4.7K	1%	1/6W
R133	RN14BK2C47R0F	RES. METAL FILM	47	1%	1/6W
R134	RN14BK2C1002F	RES. METAL FILM	10K	1%	1/6W
R135	RN14BK2C1002F	RES. METAL FILM	10K	1%	1/6W
R136	RN14BK2C1301F	RES. METAL FILM	1.3K	1%	1/6W
R137	RN14BK2C1301F	RES. METAL FILM	1.3K	1%	1/6W
R138	RN14BK2C1801F	RES. METAL FILM	1.8K	1%	1/6W
R139	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R140	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R141	RD14BB2C272J	RES. CARBON	2.7K	5%	1/6W
R142	RD14BB2C272J	RES. CARBON	2.7K	5%	1/6W
R143	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R144	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R145	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R146	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R147	RN14BK2C1001F	RES. METAL FILM	1K	1%	1/6W
R148	RD14BB2C273J	RES. CARBON	27K	5%	1/6W
R149	RD14BB2C361J	RES. CARBON	360	5%	1/6W
R150	RD14BB2C333J	RES. CARBON	33K	5%	1/6W
R151	RD14BB2C513J	RES. CARBON	51K	5%	1/6W
R152	RD14BB2C333J	RES. CARBON	33K	5%	1/6W
R153	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R154	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R155	RD14BB2C752J	RES. CARBON	7.5K	5%	1/6W
R156	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R157	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R158	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R159	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R160	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R161	RD14BB2C431J	RES. CARBON	430	5%	1/6W
R162	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R163	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R164	RD14BB2C622J	RES. CARBON	6.2K	5%	1/6W
R165	RD14BB2C362J	RES. CARBON	3.6K	5%	1/6W
R166	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R170	R92-1578-05	RES. LINEAR PCT	3.9K	5%	1/6W
R171	NO USE				
R172	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R173	NO USE				
R174	RD14BB2C201J	RES. CARBON	200	5%	1/6W
R175	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R176	NO USE				
R177	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R201	RD14BB2E220J	RES. CARBON	22	5%	1/4W
R202	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R203	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R204	RD14BB2C105J	RES. CARBON	1M	5%	1/6W
R207	RD14BB2C684J	RES. CARBON	680K	5%	1/6W
R208	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R209	RD14BB2C132J	RES. CARBON	1.3K	5%	1/6W
R210	NO USE				
R211	RD14BB2C160J	RES. CARBON	16	5%	1/6W
R212	RN14BK2C2200F	RES. METAL FILM	220	1%	1/6W
R213	NO USE				
R214	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R215	RN14BK2C1301F	RES. METAL FILM	1.3K	1%	1/6W
R216	RN14BK2C1301F	RES. METAL FILM	1.3K	1%	1/6W
R217	RN14BK2C3301F	RES. METAL FILM	3.3K	1%	1/6W
R218	RN14BK2C2401F	RES. METAL FILM	2.4K	1%	1/6W
R219	RN14BK2C5100F	RES. METAL FILM	510	1%	1/6W
R220	RD14BB2C301J	RES. CARBON	300	5%	1/6W
R221	RN14BK2C1004F	RES. METAL FILM	1M	1%	1/6W
R222	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R223	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R224	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R225	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
R226	RD14BB2C273J	RES. CARBON	27K	5%	1/6W
R227	RD14BB2C163J	RES. CARBON	16K	5%	1/6W
R228	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R229	NO USE				
R230	RD14BB2C823J	RES. CARBON	82K	5%	1/6W
R231	NO USE				
R232	RN14BK2C4701F	RES. METAL FILM	4.7K	1%	1/6W
R233	RN14BK2C47R0F	RES. METAL FILM	47	1%	1/6W
R234	RN14BK2C1002F	RES. METAL FILM	10K	1%	1/6W
R235	RN14BK2C1002F	RES. METAL FILM	10K	1%	1/6W
R236	RN14BK2C1301F	RES. METAL FILM	1.3K	1%	1/6W
R237	RN14BK2C1301F	RES. METAL FILM	1.3K	1%	1/6W
R238	RN14BK2C1801F	RES. METAL FILM	1.8K	1%	1/6W
R239	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R240	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R241	RD14BB2C272J	RES. CARBON	2.7K	5%	1/6W
R242	RD14BB2C272J	RES. CARBON	2.7K	5%	1/6W
R243	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R244	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R245	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R246	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R247	RN14BK2C1001F	RES. METAL FILM	1K	1%	1/6W
R248	RD14BB2C273J	RES. CARBON	27K	5%	1/6W
R249	RD14BB2C361J	RES. CARBON	360	5%	1/6W
R250	RD14BB2C333J	RES. CARBON	33K	5%	1/6W
R251	RD14BB2C513J	RES. CARBON	51K	5%	1/6W
R252	RD14BB2C333J	RES. CARBON	33K	5%	1/6W
R253	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R254	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R255	RD14BB2C752J	RES. CARBON	7.5K	5%	1/6W
R256	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R257	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R258	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R259	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R260	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R261	RD14BB2C431J	RES. CARBON	430	5%	1/6W
R262	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R263	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R264	RD14BB2C622J	RES. CARBON	6.2K	5%	1/6W
R265	RD14BB2C362J	RES. CARBON	3.6K	5%	1/6W
R266	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R267	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R268	RD14BB2C361J	RES. CARBON	360	5%	1/6W
R269	RD14BB2C271J	RES. CARBON	270	5%	1/6W
R270	R92-1578-05	RES. LINEAR PCT	3.9K	5%	1/6W
R271	RD14BB2C121J	RES. CARBON	120	5%	1/6W
R272	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R273	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R274	RD14BB2C201J	RES. CARBON	200	5%	1/6W
R275	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R276	NO USE				
R277	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R300	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R301	RN14BK2C8003F	RES. METAL FILM	800K	1%	1/6W
R302	RN14BK2C2003F	RES. METAL FILM	200K	1%	1/6W
R303	NO USE				
R304	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R305	RD14BB2C331J	RES. CARBON	330	5%	1/6W
R306	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R307	RD14BB2C822J	RES. CARBON	8.2K	5%	1/6W
R308	RD14BB2C302J	RES. CARBON	3K	5%	1/6W
R309	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R310	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R311	RD14BB2C362J	RES. CARBON	3.6K	5%	1/6W
R312	RD14BB2C362J	RES. CARBON	3.6K	5%	1/6W
R313	RD14BB2C621J	RES. CARBON	620	5%	1/6W
R314	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R315	RD14BB2C302J	RES. CARBON	3K	5%	1/6W
R316	RN14BK2C7500F	RES. METAL FILM	750	1%	1/6W
R317	RD14BB2C112J	RES. CARBON	1.1K	5%	1/6W
R318	RD14BB2C112J	RES. CARBON	1.1K	5%	1/6W
R319	RN14BK2C4300F	RES. METAL FILM	430	1%	1/6W
R320	RN14BK2C3301F	RES. METAL FILM	3.3K	1%	1/6W
R321	RN14BK2C6801F	RES. METAL FILM	6.8K	1%	1/6W
R322	RN14BK2C8200F	RES. METAL FILM	820	1%	1/6W
R323	RN14BK2C8200F	RES. METAL FILM	820	1%	1/6W
R324	RD14BB2C203J	RES. CARBON	20K	5%	1/6W
R325	RD14BB2C333J	RES. CARBON	33K	5%	1/6W
R326	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R327	RD14BB2C362J	RES. CARBON	3.6K	5%	1/6W
R328	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R329	RD14BB2C362J	RES. CARBON	3.6K	5%	1/6W
R330	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R331	NO USE				
R332	RD14BB2C113J	RES. CARBON	11K	5%	1/6W
R333	RD14BB2C302J	RES. CARBON	3K	5%	1/6W
R334	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R335	RD14BB2C821J	RES. CARBON	820	5%	1/6W
R336	RD14BB2C471J	RES. CARBON	470	5%	1/6W
R337	RD14BB2C132J	RES. CARBON	1.3K	5%	1/6W
R338	R92-1577-05	RES. LINEAR PCT	1K	5%	1/6W
R339	NO USE				
R340	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R341	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R342	NO USE				
R343	RD14BB2C121J	RES. CARBON	120	5%	1/6W
R344	RD14BB2C101J	RES. CARBON	100	5%	1/6W

REF.NO	PARTS NO	NAME & DESCRIPTION			
R345	R92-1579-05	RES. LINEAR PCT	220		
R346	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R347	RD14BB2C362J	RES. CARBON	3.6K	5%	1/6W
R348	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R401	RN14BK2C2201F	RES. METAL FILM	2.2K	1%	1/6W
R407	RN14BK2C2201F	RES. METAL FILM	2.2K	1%	1/6W
R413	RN14BK2C1801D	RES. METAL FILM	1.8K	0.5%	1/6W
R414	RN14BK2C1002D	RES. METAL FILM	10K	0.5%	1/6W
R415	RN14BK2C2002D	RES. METAL FILM	20K	0.5%	1/6W
R416	RN14BK2C4022D	RES. METAL FILM	40.2K	0.5%	1/6W
R417	RN14BK2C8062D	RES. METAL FILM	80.6K	0.5%	1/6W
R418	RN14BK2C1603D	RES. METAL FILM	160K	0.5%	1/6W
R419	RN14BK2C2153D	RES. METAL FILM	215K	0.5%	1/6W
R420	NO USE				
R421	RN14BK2C1801D	RES. METAL FILM	1.8K	0.5%	1/6W
R422	RN14BK2C1002D	RES. METAL FILM	10K	0.5%	1/6W
R423	RN14BK2C2002D	RES. METAL FILM	20K	0.5%	1/6W
R424	RN14BK2C4022D	RES. METAL FILM	40.2K	0.5%	1/6W
R425	RN14BK2C8062D	RES. METAL FILM	80.6K	0.5%	1/6W
R426	RN14BK2C1603D	RES. METAL FILM	160K	0.5%	1/6W
R427	RN14BK2C2153D	RES. METAL FILM	215K	0.5%	1/6W
R428	NO USE				
R429	RN14BK2C5101F	RES. METAL FILM	5.1K	1%	1/6W
R430	RN14BK2C1003D	RES. METAL FILM	100K	0.5%	1/6W
R431	RN14BK2C5002D	RES. METAL FILM	50K	0.5%	1/6W
R432	RN14BK2C3002D	RES. METAL FILM	30K	0.5%	1/6W
R433	RN14BK2C2002D	RES. METAL FILM	20K	0.5%	1/6W
R434	NO USE				
R435	RN14BK2C1502F	RES. METAL FILM	15K	1%	1/6W
R436	RN14BK2C1003D	RES. METAL FILM	100K	0.5%	1/6W
R437	RN14BK2C5002D	RES. METAL FILM	50K	0.5%	1/6W
R438	RN14BK2C3002D	RES. METAL FILM	30K	0.5%	1/6W
R439	RN14BK2C2002D	RES. METAL FILM	20K	0.5%	1/6W
R440	RN14BK2C2101F	RES. METAL FILM	2.1K	1%	1/6W
R441	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R442	RN14BK2C1002F	RES. METAL FILM	10K	1%	1/6W
R443	RN14BK2C2002F	RES. METAL FILM	20K	1%	1/6W
R444	RN14BK2C4022F	RES. METAL FILM	40.2K	1%	1/6W
R445	RN14BK2C8062F	RES. METAL FILM	80.6K	1%	1/6W
R446	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R447	RD14BB2C221J	RES. CARBON	220	5%	1/6W
S101	S64-0603-05	LEVER SWITCH			
S102	S60-0609-05	ATTENUATOR			
S201	S64-0603-05	LEVER SWITCH			
S202	S60-0609-05	ATTENUATOR			
S401	S60-0612-05	ROTARY SWITCH			
TC105	C91-2589-05	CAP. CERAMIC	22P	5%	50V
TC106	C05-0469-05	CAP. TRIMMER	10P		
TC205	C05-0470-05	CAP. TRIMMER	20P		
TC206	C05-0469-05	CAP. TRIMMER	10P		
TC301	C05-0469-05	CAP. TRIMMER	10P		
TC302	C05-0471-05	CAP. TRIMMER	30P		
TH101	112-102-2	THERMISTOR			
TH102	112-201-2FM	THERMISTOR			
TH201	112-102-2	THERMISTOR			
TH202	112-201-2FM	THERMISTOR			
TH301	112-201-2FM	THERMISTOR			
U1	KMS01	IC,LINEAR			
U2	SN74LS158N	IC,QUAD 2-1 DATA SELECTOR/MPX			
U3	SN74LS112AN	IC,DUAL J-K F.F.			
U4	SN74LS00N	IC,QUAD 2-INPUT NAND GATE			
U101	KMC13	IC,LINEAR			
U102	KMC12	IC,LINEAR			
U201	KMC13	IC,LINEAR			
U202	KMC12	IC,LINEAR			
U401	NJM072L	IC,J-FET INPUT OP AMP			
U402	NJM072D	IC,J-FET INPUT OP AMP			
U403	NJM4558L	IC,DUAL OP AMP			
U404	TC4053BP	IC,TRIPLE 2-CH MPX/DE-MPX			
U405	TC4053BP	IC,TRIPLE 2-CH MPX/DE-MPX			
VR1	R12-0679-05	RES. SEMI FIXED	22KB		
VR31	R12-0880-05	RES. SEMI FIXED	220		
VR102	R12-0885-05	RES. SEMI FIXED	100		
VR103	R12-0680-05	RES. SEMI FIXED	47K		
VR104	R12-0885-05	RES. SEMI FIXED	100		
VR105	R12-0679-05	RES. SEMI FIXED	22KB		
VR106	R12-0679-05	RES. SEMI FIXED	22KB		

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION
VR202	R12-0885-05	RES. SEMI FIXED 100
VR203	R12-0680-05	RES. SEMI FIXED 47K
VR204	R12-0885-05	RES. SEMI FIXED 100
VR205	R12-0679-05	RES. SEMI FIXED 22KB
VR206	R12-0679-05	RES. SEMI FIXED 22KB
VR207	R12-0885-05	RES. SEMI FIXED 100
VR208	R12-0885-05	RES. SEMI FIXED 100
VR301	R12-0887-05	RES. SEMI FIXED 470
VR302	R12-0680-05	RES. SEMI FIXED 47K
VR303	R12-0679-05	RES. SEMI FIXED 22KB
VR402	R12-3599-05	RES. SEMI FIXED 22K
VR403	R12-3599-05	RES. SEMI FIXED 22K

CS-5235 VERTICAL UNIT

X73-2070-01

REF.NO	PARTS NO	NAME & DESCRIPTION			
	A22-1308-03	SUB PANEL			
	E21-0667-05	METAL TERMINAL			
	E23-0149-05	GND TERMINAL			
	F01-2318-04	HEAT SINK			
	F10-1590-14	SHIELD PLATE,ATT			
	F10-1668-04	SHIELD PLATE			
	J30-0623-04	SPACER			
	J73-0283-22	PCB (UNMOUNTED)			
C2	CC45FCH1H101J	CAP. CERAMIC	100P	5%	50V
C7	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C30	C91-0747-05	CAP. CERAMIC	150P	10%	50V
C31	C91-0747-05	CAP. CERAMIC	150P	10%	50V
C32	C91-0748-05	CAP. CERAMIC	180P	10%	50V
C33	C91-2595-05	CAP. CERAMIC	68P	5%	50V
C34	CE04LW0J331M	CAP. ELECTRO	330	20%	6.3V
C35	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C36	C91-0745-05	CAP. CERAMIC	100P	10%	50V
C37	C91-0745-05	CAP. CERAMIC	100P	10%	50V
C38	C91-0745-05	CAP. CERAMIC	100P	10%	50V
C39	CE04CW1C470M	CAP. ELECTRO	47	20%	16V
C40	CE04LW1A470M	CAP. ELECTRO	47	20%	10V
C51	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C52	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C53	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C54	CE04LW1C330M	CAP. ELECTRO	33	20%	16V
C57	CE04HW1C220M	CAP. ELECTRO	22	20%	16V
C58	CC45FCH1H090D	CAP. CERAMIC	9P	0.5P	50V
C59	CE04LW1E470M	CAP. ELECTRO	47	20%	25V
C101	C91-2605-05	CAP. CERAMIC	470P	5%	50V
C102	C91-2580-05	CAP. POLYESTER	0.047	10%	400V
C103	C91-2579-05	CAP. POLYESTER	0.01	10%	400V
C104	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C105	CE04LW1A101M	CAP. ELECTRO	100	20%	10V
C110	CC45FCH1H680J	CAP. CERAMIC	68P	5%	50V
C111	NO USE				
C112	CC45FCH1H100D	CAP. CERAMIC	10P	0.5P	50V
C113	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C114	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C117	CE04CW1C470M	CAP. ELECTRO	47	20%	16V
C118	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C122	CC45FCH1H560J	CAP. CERAMIC	56P	5%	50V
C125	CF92FV1H332J	CAP. POLYESTER	3300P	5%	50V
C201	C91-2603-05	CAP. CERAMIC	330P	5%	50V
C202	C91-2580-05	CAP. POLYESTER	0.047	10%	400V
C203	C91-2579-05	CAP. POLYESTER	0.01	10%	400V
C204	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C205	CE04LW1A101M	CAP. ELECTRO	100	20%	10V
C210	CC45FCH1H680J	CAP. CERAMIC	68P	5%	50V
C211	NO USE				
C212	CC45FCH1H100D	CAP. CERAMIC	10P	0.5P	50V
C213	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C214	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C217	CE04CW1C470M	CAP. ELECTRO	47	20%	16V
C218	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C221	CE04LW1E470M	CAP. ELECTRO	47	20%	25V
C222	CC45FCH1H560J	CAP. CERAMIC	56P	5%	50V
C225	CF92FV1H332J	CAP. POLYESTER	3300P	5%	50V
C301	CC45FCH1H070D	CAP. CERAMIC	7P	0.5P	50V
C302	CC45FCH1H150J	CAP. CERAMIC	15P	5%	50V
C303	CK45FB1H102K	CAP. CERAMIC	1000P	10%	50V
C304	NO USE				
C305	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C306	CC45FCH1H220J	CAP. CERAMIC	22P	5%	50V
C307	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C313	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C314	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C315	NO USE				
C316	CE04EW1E470M	CAP. ELECTRO	47	20%	25V
C319	CE04LW1C470M	CAP. ELECTRO	47	20%	16V
C320	C91-0711-05	CAP. CERAMIC	1.5P	20%	50V
C402	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C403	CE04LW1C470M	CAP. ELECTRO	47	20%	16V
C407	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C410	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C411	NO USE				
C412	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C418	CE04EW1A101M	CAP. ELECTRO	100	20%	10V
C901	CK45B1H102K	CAP. CERAMIC	1000P	10%	50V
D2	1SS132	DIODE			
D31	1SS132	DIODE			
D32	1SS132	DIODE			
D35	1SS132	DIODE			
D36	1SS132	DIODE			
D37	1SS132	DIODE			
D101	1SS132	DIODE			
D102	1SS132	DIODE			
D103	1SS132	DIODE			
D104	1SS132	DIODE			
D105	1SS132	DIODE			
D106	1SS132	DIODE			
D107	1SS132	DIODE			
D108	1SS132	DIODE			
D201	1SS132	DIODE			
D202	1SS132	DIODE			
D203	1SS132	DIODE			
D204	1SS132	DIODE			
D205	1SS132	DIODE			
D206	1SS132	DIODE			
D207	1SS132	DIODE			
D208	1SS132	DIODE			
D301	1SS132	DIODE			
D302	1SS132	DIODE			
D303	1SS132	DIODE			
D304	1SS132	DIODE			
D305	1SS132	DIODE			
D306	1SS132	DIODE			
D307	1SS132	DIODE			
D308	1SS132	DIODE			
D309	1SS132	DIODE			
JW6	E38-0985-05	WIRE ASS'Y;V TO H TRG			
JW10	E38-0986-05	WIRE ASS'Y;V TO H SWP			
JW301	E38-0987-15	WIRE ASS'Y;CH3 INPUT			
JW501	E38-0983-25	WIRE ASS'Y;SUB PANEL TO GND			
L1	L79-0553-05	NOISE FILTER			
L40	L40-2201-17	FERRI INDUCTOR	22UH	10%	
L51	L40-4791-17	FERRI INDUCTOR	4.7UH	10%	
L52	L40-4791-17	FERRI INDUCTOR	4.7UH	10%	
L301	L40-4781-17	FERRI INDUCTOR	0.47UH	10%	
P1	E04-0259-05	BNC RECEPTACLE			
P2	E04-0259-05	BNC RECEPTACLE			
P3	E04-0259-05	BNC RECEPTACLE			
P4	E40-7515-05	PIN CONNECTOR	3P		
P9	E40-7518-05	PIN CONNECTOR	6P		
P12	E40-5066-05	PIN CONNECTOR	9P		
P13	E40-7515-05	PIN CONNECTOR	3P		
P201	E40-7432-05	PIN CONNECTOR	13P		
P202	E40-7423-05	PIN CONNECTOR	4P		
P203	E40-7430-05	PIN CONNECTOR	11P		
P204	E40-7426-05	PIN CONNECTOR	7P		
P205	E40-7422-05	PIN CONNECTOR	3P		
P206	E40-7426-05	PIN CONNECTOR	7P		
P207	E40-7432-05	PIN CONNECTOR	13P		

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
P208	E40-7432-05	PIN CONNECTOR	13P		
Q1	2SC1740S(R,S)	TR. SI, NPN			
Q2	2SC3779(D)	TR. SI, NPN			
Q3	2SC3779(D)	TR. SI, NPN			
Q32	2SC3066(G)	TR. SI, NPN			
Q33	2SC1740S(R,S)	TR. SI, NPN			
Q34	2SA933S(R,S)	TR. SI, PNP			
Q51	2SC1923(O)	TR. SI, NPN			
Q101	2SC1923(O)	TR. SI, NPN			
Q102	2SK404(E)	FET, N-CHANNEL			
Q103	2SC1923(O)	TR. SI, NPN			
Q106	2SC3779(D)	TR. SI, NPN			
Q107	2SC3779(D)	TR. SI, NPN			
Q108	2SA1005(K)	TR. SI, PNP			
Q109	2SA1005(K)	TR. SI, PNP			
Q110	2SA1005(K)	TR. SI, PNP			
Q111	2SA1005(K)	TR. SI, PNP			
Q114	2SA1005(K)	TR. SI, PNP			
Q152	2SA1005(K)	TR. SI, PNP			
Q153	2SA1005(K)	TR. SI, PNP			
Q201	2SC1923(O)	TR. SI, NPN			
Q202	2SK404(E)	FET, N-CHANNEL			
Q203	2SC1923(O)	TR. SI, NPN			
Q206	2SC3779(D)	TR. SI, NPN			
Q207	2SC3779(D)	TR. SI, NPN			
Q208	2SA1005(K)	TR. SI, PNP			
Q209	2SA1005(K)	TR. SI, PNP			
Q210	2SA1005(K)	TR. SI, PNP			
Q211	2SA1005(K)	TR. SI, PNP			
Q214	2SA1005(K)	TR. SI, PNP			
Q215	2SC1740S(R,S)	TR. SI, NPN			
Q252	2SA1005(K)	TR. SI, PNP			
Q253	2SA1005(K)	TR. SI, PNP			
Q302	2SC1923(O)	TR. SI, NPN			
Q303	2SK404(E)	FET, N-CHANNEL			
Q304	2SC1923(O)	TR. SI, NPN			
Q305	2SA1005(K)	TR. SI, PNP			
Q306	2SA1005(K)	TR. SI, PNP			
Q307	2SC1923(O)	TR. SI, NPN			
Q308	2SC1923(O)	TR. SI, NPN			
Q309	2SC1923(O)	TR. SI, NPN			
Q310	2SA1005(K)	TR. SI, PNP			
Q311	2SA1005(K)	TR. SI, PNP			
Q312	2SC1923(O)	TR. SI, NPN			
Q313	2SA1005(K)	TR. SI, PNP			
Q314	2SA1005(K)	TR. SI, PNP			
R1	RN14BK2C2002F	RES. METAL FILM	20K	1%	1/6W
R2	RN14BK2C2001F	RES. METAL FILM	2K	1%	1/6W
R3	RN14BK2C2001F	RES. METAL FILM	2K	1%	1/6W
R6	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R7	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R8	RN14BK2C3900F	RES. METAL FILM	390	1%	1/6W
R9	RN14BK2C3900F	RES. METAL FILM	390	1%	1/6W
R10	RN14BK2C7500F	RES. METAL FILM	750	1%	1/6W
R11	RN14BK2C7500F	RES. METAL FILM	750	1%	1/6W
R12	R92-1553-05	RES. SPECIAL POWER	620	5%	1W
R17	RN14BK2C6200F	RES. METAL FILM	620	1%	1/6W
R18	RN14BK2C6200F	RES. METAL FILM	620	1%	1/6W
R19	RN14BK2C39R0F	RES. METAL FILM	39	1%	1/6W
R20	RN14BK2C39R0F	RES. METAL FILM	39	1%	1/6W
R21	NO USE				
R22	RN14BK2C6802F	RES. METAL FILM	68K	1%	1/6W
R31	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R32	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R33	RD14BB2C751J	RES. CARBON	750	5%	1/6W
R34	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R35	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R36	R90-0645-05	RES. NETWORK	4X10K		
R37	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R38	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R39	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R40	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R41	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R42	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R43	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R44	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R45	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R52	RD14BB2C391J	RES. CARBON	390	5%	1/6W
R59	RD14BB2C432J	RES. CARBON	4.3K	5%	1/6W
R62	RD14BB2C301J	RES. CARBON	300	5%	1/6W
R63	RD14BB2C821J	RES. CARBON	820	5%	1/6W
R64	RD14BB2C133J	RES. CARBON	13K	5%	1/6W
R65	RD14BB2C910J	RES. CARBON	91	5%	1/6W
R66	RD14BB2C910J	RES. CARBON	91	5%	1/6W
R67	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R68	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R69	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R70	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R71	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R101	RD14BB2E220J	RES. CARBON	22	5%	1/4W
R102	NO USE				
R103	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R104	RD14BB2C105J	RES. CARBON	1M	5%	1/6W
R107	RD14BB2C684J	RES. CARBON	680K	5%	1/6W
R108	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R109	RD14BB2C132J	RES. CARBON	1.3K	5%	1/6W
R110	NO USE				
R111	RD14BB2C160J	RES. CARBON	16	5%	1/6W
R112	RN14BK2C2700F	RES. METAL FILM	270	1%	1/6W
R113	NO USE				
R114	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R115	RN14BK2C1301F	RES. METAL FILM	1.3K	1%	1/6W
R116	RN14BK2C1301F	RES. METAL FILM	1.3K	1%	1/6W
R117	RN14BK2C3301F	RES. METAL FILM	3.3K	1%	1/6W
R118	RN14BK2C2401F	RES. METAL FILM	2.4K	1%	1/6W
R119	RN14BK2C5100F	RES. METAL FILM	510	1%	1/6W
R120	RD14BB2C301J	RES. CARBON	300	5%	1/6W
R121	RN14BK2C1004F	RES. METAL FILM	1M	1%	1/6W
R122	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R123	RD14BB2C331J	RES. CARBON	330	5%	1/6W
R124	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R125	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R126	RD14BB2C273J	RES. CARBON	27K	5%	1/6W
R127	RD14BB2C163J	RES. CARBON	16K	5%	1/6W
R128	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R129	NO USE				
R130	RD14BB2C823J	RES. CARBON	82K	5%	1/6W
R131	NO USE				
R132	RN14BK2C4701F	RES. METAL FILM	4.7K	1%	1/6W
R133	RN14BK2C47R0F	RES. METAL FILM	47	1%	1/6W
R134	RN14BK2C1002F	RES. METAL FILM	10K	1%	1/6W
R135	RN14BK2C1002F	RES. METAL FILM	10K	1%	1/6W
R136	RN14BK2C1301F	RES. METAL FILM	1.3K	1%	1/6W
R137	RN14BK2C1301F	RES. METAL FILM	1.3K	1%	1/6W
R138	RN14BK2C1801F	RES. METAL FILM	1.8K	1%	1/6W
R139	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R140	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R141	RD14BB2C272J	RES. CARBON	2.7K	5%	1/6W
R142	RD14BB2C272J	RES. CARBON	2.7K	5%	1/6W
R143	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R144	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R145	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R146	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R147	RN14BK2C1001F	RES. METAL FILM	1K	1%	1/6W
R148	RD14BB2C273J	RES. CARBON	27K	5%	1/6W
R149	RD14BB2C361J	RES. CARBON	360	5%	1/6W
R150	RD14BB2C333J	RES. CARBON	33K	5%	1/6W
R151	RD14BB2C513J	RES. CARBON	51K	5%	1/6W
R152	RD14BB2C333J	RES. CARBON	33K	5%	1/6W
R153	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R154	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R155	RD14BB2C752J	RES. CARBON	7.5K	5%	1/6W
R156	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R157	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R158	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R159	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R160	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R161	RD14BB2C431J	RES. CARBON	430	5%	1/6W
R162	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R163	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R164	RD14BB2C622J	RES. CARBON	6.2K	5%	1/6W
R165	RD14BB2C362J	RES. CARBON	3.6K	5%	1/6W
R166	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R170	R92-1578-05	RES. LINEAR PCT	3.9K	5%	1/6W
R171	NO USE				
R172	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R173	NO USE				
R174	RD14BB2C201J	RES. CARBON	200	5%	1/6W
R175	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R176	NO USE				
R177	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R201	RD14BB2E220J	RES. CARBON	22	5%	1/4W
R202	NO USE				
R203	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R204	RD14BB2C105J	RES. CARBON	1M	5%	1/6W
R207	RD14BB2C684J	RES. CARBON	680K	5%	1/6W
R208	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R209	RD14BB2C132J	RES. CARBON	1.3K	5%	1/6W
R210	NO USE				
R211	RD14BB2C160J	RES. CARBON	16	5%	1/6W
R212	RN14BK2C2200F	RES. METAL FILM	220	1%	1/6W
R213	NO USE				

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
R214	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R215	RN14BK2C1301F	RES. METAL FILM	1.3K	1%	1/6W
R216	RN14BK2C1301F	RES. METAL FILM	1.3K	1%	1/6W
R217	RN14BK2C3301F	RES. METAL FILM	3.3K	1%	1/6W
R218	RN14BK2C2401F	RES. METAL FILM	2.4K	1%	1/6W
R219	RN14BK2C5100F	RES. METAL FILM	510	1%	1/6W
R220	RD14BB2C301J	RES. CARBON	300	5%	1/6W
R221	RN14BK2C1004F	RES. METAL FILM	1M	1%	1/6W
R222	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R223	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R224	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R225	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R226	RD14BB2C273J	RES. CARBON	27K	5%	1/6W
R227	RD14BB2C163J	RES. CARBON	16K	5%	1/6W
R228	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R229	NO USE				
R230	RD14BB2C823J	RES. CARBON	82K	5%	1/6W
R231	NO USE				
R232	RN14BK2C4701F	RES. METAL FILM	4.7K	1%	1/6W
R233	RN14BK2C47R0F	RES. METAL FILM	47	1%	1/6W
R234	RN14BK2C1002F	RES. METAL FILM	10K	1%	1/6W
R235	RN14BK2C1002F	RES. METAL FILM	10K	1%	1/6W
R236	RN14BK2C1301F	RES. METAL FILM	1.3K	1%	1/6W
R237	RN14BK2C1301F	RES. METAL FILM	1.3K	1%	1/6W
R238	RN14BK2C1801F	RES. METAL FILM	1.8K	1%	1/6W
R239	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R240	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R241	RD14BB2C272J	RES. CARBON	2.7K	5%	1/6W
R242	RD14BB2C272J	RES. CARBON	2.7K	5%	1/6W
R243	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R244	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R245	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R246	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R247	RN14BK2C1001F	RES. METAL FILM	1K	1%	1/6W
R248	RD14BB2C273J	RES. CARBON	27K	5%	1/6W
R249	RD14BB2C361J	RES. CARBON	360	5%	1/6W
R250	RD14BB2C333J	RES. CARBON	33K	5%	1/6W
R251	RD14BB2C513J	RES. CARBON	51K	5%	1/6W
R252	RD14BB2C333J	RES. CARBON	33K	5%	1/6W
R253	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R254	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R255	RD14BB2C752J	RES. CARBON	7.5K	5%	1/6W
R256	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R257	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R258	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R259	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R260	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R261	RD14BB2C431J	RES. CARBON	430	5%	1/6W
R262	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R263	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R264	RD14BB2C622J	RES. CARBON	6.2K	5%	1/6W
R265	RD14BB2C362J	RES. CARBON	3.6K	5%	1/6W
R266	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R267	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R268	RD14BB2C361J	RES. CARBON	360	5%	1/6W
R269	RD14BB2C271J	RES. CARBON	270	5%	1/6W
R270	R92-1578-05	RES. LINEAR PCT	3.9K	5%	1/6W
R271	RD14BB2C121J	RES. CARBON	120	5%	1/6W
R272	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R273	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R274	RD14BB2C201J	RES. CARBON	200	5%	1/6W
R275	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R276	NO USE				
R277	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R300	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R301	RN14BK2C8003F	RES. METAL FILM	800K	1%	1/6W
R302	RN14BK2C2003F	RES. METAL FILM	200K	1%	1/6W
R303	NO USE				
R304	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R305	RD14BB2C331J	RES. CARBON	330	5%	1/6W
R306	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R307	RD14BB2C822J	RES. CARBON	8.2K	5%	1/6W
R308	RD14BB2C302J	RES. CARBON	3K	5%	1/6W
R309	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R310	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R311	RD14BB2C362J	RES. CARBON	3.6K	5%	1/6W
R312	RD14BB2C362J	RES. CARBON	3.6K	5%	1/6W
R313	RD14BB2C621J	RES. CARBON	620	5%	1/6W
R314	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R315	RD14BB2C302J	RES. CARBON	3K	5%	1/6W
R316	RN14BK2C7500F	RES. METAL FILM	750	1%	1/6W
R317	RD14BB2C112J	RES. CARBON	1.1K	5%	1/6W
R318	RD14BB2C112J	RES. CARBON	1.1K	5%	1/6W
R319	RN14BK2C4300F	RES. METAL FILM	430	1%	1/6W
R320	RN14BK2C3301F	RES. METAL FILM	3.3K	1%	1/6W
R321	RN14BK2C6801F	RES. METAL FILM	6.8K	1%	1/6W
R322	RN14BK2C8200F	RES. METAL FILM	820	1%	1/6W
R323	RN14BK2C8200F	RES. METAL FILM	820	1%	1/6W
R324	RD14BB2C203J	RES. CARBON	20K	5%	1/6W
R325	RD14BB2C333J	RES. CARBON	33K	5%	1/6W
R326	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R327	RD14BB2C362J	RES. CARBON	3.6K	5%	1/6W
R328	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R329	RD14BB2C362J	RES. CARBON	3.6K	5%	1/6W
R330	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R331	NO USE				
R332	RD14BB2C113J	RES. CARBON	11K	5%	1/6W
R333	RD14BB2C302J	RES. CARBON	3K	5%	1/6W
R334	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R335	RD14BB2C821J	RES. CARBON	820	5%	1/6W
R336	RD14BB2C471J	RES. CARBON	470	5%	1/6W
R337	RD14BB2C132J	RES. CARBON	1.3K	5%	1/6W
R338	R92-1577-05	RES. LINEAR PCT	1K	5%	1/6W
R339	NO USE				
R340	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R341	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R342	NO USE				
R343	RD14BB2C121J	RES. CARBON	120	5%	1/6W
R344	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R345	R92-1579-05	RES. LINEAR PCT	220		
R346	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R347	RD14BB2C362J	RES. CARBON	3.6K	5%	1/6W
R348	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R414	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R415	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R416	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R417	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R418	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R422	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R423	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R424	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R425	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R426	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R429	RN14BK2C5101F	RES. METAL FILM	5.1K	1%	1/6W
R430	RN14BK2C1003D	RES. METAL FILM	100K	0.5%	1/6W
R431	RN14BK2C5002D	RES. METAL FILM	50K	0.5%	1/6W
R432	RN14BK2C3002D	RES. METAL FILM	30K	0.5%	1/6W
R433	RN14BK2C2002D	RES. METAL FILM	20K	0.5%	1/6W
R434	NO USE				
R435	RN14BK2C1502F	RES. METAL FILM	15K	1%	1/6W
R436	RN14BK2C1003D	RES. METAL FILM	100K	0.5%	1/6W
R437	RN14BK2C5002D	RES. METAL FILM	50K	0.5%	1/6W
R438	RN14BK2C3002D	RES. METAL FILM	30K	0.5%	1/6W
R439	RN14BK2C2002D	RES. METAL FILM	20K	0.5%	1/6W
R446	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R447	RD14BB2C221J	RES. CARBON	220	5%	1/6W
S101	S64-0603-05	LEVER SWITCH			
S102	S60-0608-05	ATTENUATOR			
S201	S64-0603-05	LEVER SWITCH			
S202	S60-0608-05	ATTENUATOR			
S401	S60-0612-05	ROTARY SWITCH			
TC105	C91-2589-05	CAP. CERAMIC	22P	5%	50V
TC106	C05-0469-05	CAP. TRIMMER	10P		
TC205	C05-0470-05	CAP. TRIMMER	20P		
TC206	C05-0469-05	CAP. TRIMMER	10P		
TC301	C05-0469-05	CAP. TRIMMER	10P		
TC302	C05-0471-05	CAP. TRIMMER	30P		
TH101	112-102-2	THERMISTOR			
TH102	112-201-2FM	THERMISTOR			
TH201	112-102-2	THERMISTOR			
TH202	112-201-2FM	THERMISTOR			
TH301	112-201-2FM	THERMISTOR			
U1	KMS01	IC,LINEAR			
U2	SN74LS158N	IC,QUAD 2-1 DATA SELECTOR/MPX			
U3	SN74LS112AN	IC,DUAL J-K F.F.			
U4	SN74LS00N	IC,QUAD 2-INPUT NAND GATE			
U101	KMC13	IC,LINEAR			
U102	KMC12	IC,LINEAR			
U201	KMC13	IC,LINEAR			
U202	KMC12	IC,LINEAR			
U404	TC4053BP	IC,TRIPLE 2-CH MPX/DE-MPX			
U405	TC4053BP	IC,TRIPLE 2-CH MPX/DE-MPX			
VR1	R12-0679-05	RES. SEMI FIXED 22KB			
VR31	R12-0880-05	RES. SEMI FIXED 220			
VR102	R12-0885-05	RES. SEMI FIXED 100			
VR103	R12-0680-05	RES. SEMI FIXED 47K			
VR104	R12-0885-05	RES. SEMI FIXED 100			
VR105	R12-0679-05	RES. SEMI FIXED 22KB			
VR106	R12-0679-05	RES. SEMI FIXED 22KB			
VR202	R12-0885-05	RES. SEMI FIXED 100			
VR203	R12-0680-05	RES. SEMI FIXED 47K			
VR204	R12-0885-05	RES. SEMI FIXED 100			
VR205	R12-0679-05	RES. SEMI FIXED 22KB			
VR206	R12-0679-05	RES. SEMI FIXED 22KB			

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION
VR207	R12-0885-05	RES. SEMI FIXED 100
VR208	R12-0885-05	RES. SEMI FIXED 100
VR301	R12-0887-05	RES. SEMI FIXED 470
VR302	R12-0680-05	RES. SEMI FIXED 47K
VR303	R12-0679-05	RES. SEMI FIXED 22KB
VR402	R12-3599-05	RES. SEMI FIXED 22K
VR403	R12-3599-05	RES. SEMI FIXED 22K

CS-5230 HORIZONTAL UNIT

X74-1580-00

REF.NO	PARTS NO	NAME & DESCRIPTION			
	E23-0149-05	GND TERMINAL			
	E23-0557-14	EARTH LUG,THERMAL FUSE			
	F01-0867-05	HEAT SINK,HIGH VOLTAGE			
	F01-2316-05	HEAT SINK,POWER			
	J73-0284-22	PCB (UNMOUNTED)			
	N09-0623-04	SCREW,SEMS PAN HD M3X8			
C1	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C2	NO USE				
C3	C91-2595-05	CAP. CERAMIC	68P	5%	50V
C4	CF92FV1H103J	CAP. POLYESTER	0.01	5%	50V
C5	C91-2596-05	CAP. CERAMIC	82P	5%	50V
C6	CC45FCH1H470J	CAP. CERAMIC	47P	5%	50V
C7	CC45FCH1H010C	CAP. CERAMIC	1P	0.25P	50V
C8	CC45FCH1H040C	CAP. CERAMIC	4P	0.25P	50V
C9	NO USE				
C10	CK45FB1H222K	CAP. CERAMIC	2200P	10%	50V
C11	C91-0757-05	CAP. CERAMIC	1000P	10%	50V
C12	C91-2538-05	CAP. MYLAR	0.1		63V
C13	C91-2593-05	CAP. CERAMIC	47P	5%	50V
C14	CC45FCH1H101J	CAP. CERAMIC	100P	5%	50V
C15	NO USE				
C16	CE04LW1E100M	CAP. ELECTRO	10	20%	25V
C17	CE04LW1H010M	CAP. ELECTRO	1	20%	50V
C18	CE04LW1H010M	CAP. ELECTRO	1	20%	50V
C19	CF92FV1H682J	CAP. POLYESTER	6800P	5%	50V
C20	CF92FV1H222J	CAP. POLYESTER	2200P	5%	50V
C21	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C22	CE04HW1H010M	CAP. ELECTRO	1	20%	50V
C23	CE04HW1H010M	CAP. ELECTRO	1	20%	50V
C24	NO USE				
C25	CE04LW1E100M	CAP. ELECTRO	10	20%	25V
C26	CF92FV1H684J	CAP. POLYESTER	0.68	5%	50V
C27	CF92FV1H684J	CAP. POLYESTER	0.68	5%	50V
C28	CE04HW1E220M	CAP. ELECTRO	22	20%	25V
C29	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C30	C91-2538-05	CAP. MYLAR	0.1		63V
C31	CE04LW0J331M	CAP. ELECTRO	330	20%	6.3V
C32	CE04EW1A101M	CAP. ELECTRO	100	20%	10V
C33	CC45FCH1H020C	CAP. CERAMIC	2P	0.25P	50V
C34	CE04LW1C331M	CAP. ELECTRO	330	20%	16V
C37	CC45FSL1H221J	CAP. CERAMIC	220P	5%	50V
C38	C91-0745-05	CAP. CERAMIC	100P	10%	50V
C39	C91-0745-05	CAP. CERAMIC	100P	10%	50V
C101	CC45FCH1H470J	CAP. CERAMIC	47P	5%	50V
C102	CC45FCH1H470J	CAP. CERAMIC	47P	5%	50V
C103	CF92FV1H332J	CAP. POLYESTER	3300P	5%	50V
C104	C91-2582-05	CAP. POLYESTER	0.47	5%	100V
C105	CC45FCH1H220J	CAP. CERAMIC	22P	5%	50V
C106	CK45FB1H102K	CAP. CERAMIC	1000P	10%	50V
C107	CE04HW1H2R2M	CAP. ELECTRO	2.2	20%	50V
C108	CC45FCH1H101J	CAP. CERAMIC	100P	5%	50V
C109	NO USE				
C110	CC45FCH1H470J	CAP. CERAMIC	47P	5%	50V
C111	CF92FV1H104J	CAP. POLYESTER	0.1	5%	50V
C112	CC45FCH1H220J	CAP. CERAMIC	22P	5%	50V
C113	CC45FCH1H330J	CAP. CERAMIC	33P	5%	50V
C114	CE04LW1A220M	CAP. ELECTRO	22	20%	10V
C115	C91-2604-05	CAP. CERAMIC	390P	5%	50V
C116	C91-2598-05	CAP. CERAMIC	120P	5%	50V
C117	CC45FCH1H680J	CAP. CERAMIC	68P	5%	50V
C118	CC45FCH1H680J	CAP. CERAMIC	68P	5%	50V
C119	NO USE				
C120	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C121	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C122	CC45FCH1H390J	CAP. CERAMIC	39P	5%	50V
C123	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C124	C91-2582-05	CAP. POLYESTER	0.47	5%	100V
C125	CE04LW0J331M	CAP. ELECTRO	330	20%	6.3V
C126	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C127	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C128	C91-2538-05	CAP. MYLAR	0.1		63V
C129	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C132	CC45FCH1H030C	CAP. CERAMIC	3P	0.25P	50V
C135	CE04LW0J331M	CAP. ELECTRO	330	20%	6.3V
C136	CE04LW0J331M	CAP. ELECTRO	330	20%	6.3V
C137	CE04LW0J331M	CAP. ELECTRO	330	20%	6.3V
C138	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C139	CC45FSL1H331J	CAP. CERAMIC	330P	5%	50V
C140	CC45FCH1H470J	CAP. CERAMIC	47P	5%	50V
C141	CC45FCH1H470J	CAP. CERAMIC	47P	5%	50V
C142	CC45FCH1H470J	CAP. CERAMIC	47P	5%	50V
C143	C91-0737-05	CAP. CERAMIC	47P	5%	50V
C144	C91-0737-05	CAP. CERAMIC	47P	5%	50V
C145	CE04LW1C100M	CAP. ELECTRO	10	20%	16V
C146	CC45FSL1H030C	CAP. CERAMIC	3P	0.25P	50V
C201	CC45FCH1H070D	CAP. CERAMIC	7P	0.5P	50V
C202	NO USE				
C203	CC45FCH1H120J	CAP. CERAMIC	12P	5%	50V
C204	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C205	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C206	NO USE				
C207	CK45FB2H472K	CAP. CERAMIC	4700P	10%	500V
C208	CE04W2E010M	CAP. ELECTRO	1	20%	250V
C209	CC45FCH2H020C	CAP. CERAMIC	2P	0.25P	500V
C210	CK45FB2H472K	CAP. CERAMIC	4700P	10%	500V
C211	CE04W2E010M	CAP. ELECTRO	1	20%	250V
C212	CE04W2E010M	CAP. ELECTRO	1	20%	250V
C213	CK45FB2H102K	CAP. CERAMIC	1000P	10%	500V
C214	CK45FB2H102K	CAP. CERAMIC	1000P	10%	500V
C215	C91-1317-05	CAP. CERAMIC	0.01	80/-20%	2K
C216	C91-1317-05	CAP. CERAMIC	0.01	80/-20%	2K
C217	C91-1317-05	CAP. CERAMIC	0.01	80/-20%	2K
C218	CE04W2E010M	CAP. ELECTRO	1	20%	250V
C219	NO USE				
C220	C91-1317-05	CAP. CERAMIC	0.01	80/-20%	2K
C221	C91-1317-05	CAP. CERAMIC	0.01	80/-20%	2K
C222	CE04LW1E221M	CAP. ELECTRO	220	20%	25V
C223	CE04LW1H101M	CAP. ELECTRO	100	20%	50V
C224	CK45FB1H472K	CAP. CERAMIC	4700P	10%	50V
C227	CC45FCH2H101J	CAP. CERAMIC	100P	5%	500V
C228	CK45FB1H222K	CAP. CERAMIC	2200P	10%	50V
C229	C91-1317-05	CAP. CERAMIC	0.01	80/-20%	2K
C230	CK45E3D102P	CAP. CERAMIC	1000P		2KV
C231	C91-2581-05	CAP. CERAMIC	0.01	5%	2KV
C232	CE04W2E010M	CAP. ELECTRO	1	20%	250V
C233	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C234	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C301	CC45FCH1H101J	CAP. CERAMIC	100P	5%	50V
C302	CC45FSL1H331J	CAP. CERAMIC	330P	5%	50V
C303	C91-0713-05	CAP. CERAMIC	2.2	10%	50V
C306	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C307	C91-2585-05	CAP. MYLAR	0.01	10%	250V
C308	C91-2587-05	CAP. MYLAR	0.1	10%	250V
C309	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C310	C91-2587-05	CAP. MYLAR	0.1	10%	250V
C311	C91-2585-05	CAP. MYLAR	0.01	10%	250V
C314	CK45FB2H152K	CAP. CERAMIC	1500P	10%	500V
C315	NO USE				
C316	CE04LW0J331M	CAP. ELECTRO	330	20%	6.3V
C317	NO USE				
C318	CC45FCH1H020C	CAP. CERAMIC	2P	0.25P	50V
C319	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C320	NO USE				
C321	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C322	CE04LW1A221M	CAP. ELECTRO	220	20%	10V
C323	CC45FCH1H150J	CAP. CERAMIC	15P	5%	50V
C324	CE04LW0J331M	CAP. ELECTRO	330	20%	6.3V
C325	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C401	CE04W2E470M	CAP. ELECTRO	47	20%	250V
C402	CE04W2E100M	CAP. ELECTRO	10	20%	250V
C403	CE04LW1E220M	CAP. ELECTRO	22	20%	25V
C404	CE04EW2A471M	CAP. ELECTRO	470	20%	100V
C405	CE04LW2A220M	CAP. ELECTRO	22	20%	100V
C406	CE04EW1E472M	CAP. ELECTRO	4700	20%	25V
C407	CE04LW1C331M	CAP. ELECTRO	330	20%	16V
C408	CE04EW1E472M	CAP. ELECTRO	4700	20%	25V
C409	CE04EW1C332M	CAP. ELECTRO	3300	20%	16V
C410	CE04LW0J471M	CAP. ELECTRO	470	20%	6.3V
C411	CE04LW1C331M	CAP. ELECTRO	330	20%	16V
C412	CE04LW0J331M	CAP. ELECTRO	330	20%	6.3V
C413	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C414	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C415	CE04EW1E102M	CAP. ELECTRO	1000	20%	25V
C416	CE04EW1E102M	CAP. ELECTRO	1000	20%	25V
C417	C91-0761-05	CAP. CERAMIC	2200P	20%	50V
C418	C91-0757-05	CAP. CERAMIC	1000P	10%	50V
C901	CF92V1H103J	CAP. POLYESTER	0.01	5%	50V
D1	MA700	DIODE			
D2	MA700	DIODE			
D3	MA700	DIODE			
D4	MA700	DIODE			
D5	MA700	DIODE			
D6	1SS132	DIODE			
D7	1SS132	DIODE			
D8	1SS132	DIODE			

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION
D9	1SS132	DIODE
D10	1SS132	DIODE
D11	1SS132	DIODE
D12	MA700	DIODE
D13	1SS132	DIODE
D14	1SS132	DIODE
D15	1SS132	DIODE
D16	1SS132	DIODE
D17	1SS132	DIODE
D18	1SS132	DIODE
D101	1SS132	DIODE
D102	1SS132	DIODE
D103	1SS132	DIODE
D104	1SS132	DIODE
D105	1SS132	DIODE
D106	1SS132	DIODE
D107	1SS132	DIODE
D108	1SS132	DIODE
D109	MA700	DIODE
D110	1SS132	DIODE
D111	1SS132	DIODE
D112	1SS132	DIODE
D113	1SS132	DIODE
D114	MA700	DIODE
D115	1SS132	DIODE
D116	1SS132	DIODE
D117	1SS132	DIODE
D118	1SS132	DIODE
D119	1SS132	DIODE
D120	1SS132	DIODE
D121	1SS132	DIODE
D122	1SS132	DIODE
D123	1SS132	DIODE
D124	1SS132	DIODE
D125	1SS132	DIODE
D126	1SS132	DIODE
D127	1SS132	DIODE
D128	1SS132	DIODE
D129	1SS132	DIODE
D130	MA700	DIODE
D131	NO USE	
D132	MA700	DIODE
D133	MA700	DIODE
D201	1SS132	DIODE
D202	1SS132	DIODE
D203	1SS83	DIODE
D204	1SS83	DIODE
D205	1SS83	DIODE
D206	1SS83	DIODE
D207	1SS83	DIODE
D208	1SS83	DIODE
D209	1SS83	DIODE
D210	1SS83	DIODE
D211	1SS132	DIODE
D212	1SS132	DIODE
D213	1SS132	DIODE
D301	MA700	DIODE
D302	1SS132	DIODE
D303	MTZ3.0JA	DIODE,ZENER
D304	1SS132	DIODE
D305	1SS132	DIODE
D306	MA700	DIODE
D307	MA700	DIODE
D308	TLR112	LED,RED
D309	TLR112	LED,RED
D312	MTZ5.1JB	DIODE,ZENER
D313	1SS132	DIODE
D314	NO USE	
D315	1SS132	DIODE
D316	MTZ3.0JA	DIODE,ZENER
D401	S1VB60	DIODE,STACK
D402	S1VB60	DIODE,STACK
D403	S4VB20F	DIODE,STACK
D404	S1VB60	DIODE,STACK
D405	1SS132	DIODE
D406	1SS132	DIODE
D407	MTZ13JC	DIODE,ZENER
D408	MTZ13JC	DIODE,ZENER
D409	MTZ7.5JA	DIODE,ZENER
D801	MA700	DIODE
F201	F53-0107-05	THERMAL FUSE 400MA/125V
JW1	E38-1005-05	WIRE ASS'Y;3P
JW2	E38-1006-05	WIRE ASS'Y;6P
JW9	E38-0988-15	WIRE ASS'Y;H TO V
JW14	E38-0989-05	WIRE ASS'Y;H TO FINAL
JW18	E38-0990-05	WIRE ASS'Y;H TO CRT
JW19	E38-0991-05	WIRE ASS'Y;H TO BNC

REF.NO	PARTS NO	NAME & DESCRIPTION
K301	S76-0627-05	RELAY
L101	L79-0553-05	NOISE FILTER
L201	L40-1545-06	FERRI INDUCTOR 150MH 5%
L202	L40-1011-04	FERRI INDUCTOR 100UH 10%
L203	L40-1011-04	FERRI INDUCTOR 100UH 10%
L204	L40-3925-05	FERRI INDUCTOR 3.9MH 5%
L301	L40-1001-11	FERRI INDUCTOR 10UH 10%
NL201	NE-38B	NEON LAMP
NL202	NE-38B	NEON LAMP
NL203	NE-38B	NEON LAMP
NL204	NE-38B	NEON LAMP
P6	E40-7515-05	PIN CONNECTOR 3P
P7	E40-7519-05	PIN CONNECTOR 4P
P8	E40-7040-05	PIN CONNECTOR 13P
P9	NO USE	
P10	E40-5066-05	PIN CONNECTOR 9P
P15	E40-5067-05	PIN CONNECTOR 10P
P16	E40-5069-05	PIN CONNECTOR 12P
P17	E40-3306-05	PIN CONNECTOR 9P
P20	E40-3299-05	PIN CONNECTOR 2P
P24	E40-3243-05	PIN CONNECTOR 8P
Q3	2SC1740S(R,S)	TR. SI, NPN
Q4	2SC1923(O)	TR. SI, NPN
Q5	2SC1923(O)	TR. SI, NPN
Q6	2SC3779(D)	TR. SI, NPN
Q7	2SC3779(D)	TR. SI, NPN
Q8	NO USE	
Q9	2SA1459(K)	TR. SI, PNP
Q10	2SC1740S(R,S)	TR. SI, NPN
Q11	2SC1740S(R,S)	TR. SI, NPN
Q12	2SA1005(K)	TR. SI, PNP
Q13	2SC1740S(R,S)	TR. SI, NPN
Q14	2SC1740S(R,S)	TR. SI, NPN
Q15	2SA1005(K)	TR. SI, PNP
Q16	2SA1005(K)	TR. SI, PNP
Q17	2SA933S(R,S)	TR. SI, PNP
Q18	2SA933S(R,S)	TR. SI, PNP
Q19	2SC1740S(R,S)	TR. SI, NPN
Q20	2SA933S(R,S)	TR. SI, PNP
Q21	2SC1907	TR. SI, NPN
Q28	2SA1459(K)	TR. SI, PNP
Q101	2SK170(V)	FET, N-CHANNEL
Q102	2SC1923(O)	TR. SI, NPN
Q103	2SA933S(R,S)	TR. SI, PNP
Q104	2SC1740S(R,S)	TR. SI, NPN
Q105	2SC1740S(R,S)	TR. SI, NPN
Q106	2SC1740S(R,S)	TR. SI, NPN
Q107	2SK170(V)	FET, N-CHANNEL
Q108	2SC1923(O)	TR. SI, NPN
Q109	2SC3066(G)	TR. SI, NPN
Q110	2SA1459(K)	TR. SI, PNP
Q111	2SA933S(R,S)	TR. SI, PNP
Q112	2SA933S(R,S)	TR. SI, PNP
Q113	2SA1005(K)	TR. SI, PNP
Q114	2SA1005(K)	TR. SI, PNP
Q115	2SA1005(K)	TR. SI, PNP
Q116	2SA1005(K)	TR. SI, PNP
Q117	2SC1923(O)	TR. SI, NPN
Q118	2SC1923(O)	TR. SI, NPN
Q119	2SA933S(R,S)	TR. SI, PNP
Q120	2SA1459(K)	TR. SI, PNP
Q121	2SC1923(O)	TR. SI, NPN
Q122	2SC1740S(R,S)	TR. SI, NPN
Q123	2SC1740S(R,S)	TR. SI, NPN
Q124	2SC1740S(R,S)	TR. SI, NPN
Q125	2SC1740S(R,S)	TR. SI, NPN
Q126	2SC1740S(R,S)	TR. SI, NPN
Q127	2SA1005(K)	TR. SI, PNP
Q151	2SA1459(K)	TR. SI, PNP
Q152	2SA1459(K)	TR. SI, PNP
Q158	2SA1459(K)	TR. SI, PNP
Q201	2SA933S(R,S)	TR. SI, PNP
Q202	2SA933S(R,S)	TR. SI, PNP
Q203	2SC1923(O)	TR. SI, NPN
Q204	2SC1740S(R,S)	TR. SI, NPN
Q205	2SA933S(R,S)	TR. SI, PNP
Q206	2SC2910(S)	TR. SI, NPN
Q207	2SA1208(S)	TR. SI, PNP
Q208	2SC2910(S)	TR. SI, NPN
Q209	2SA1208(S)	TR. SI, PNP
Q210	2SC2551(O)	TR. SI, NPN
Q211	2SC2551(O)	TR. SI, NPN
Q212	2SA933S(R,S)	TR. SI, PNP
Q213	2SD613(E)	TR. SI, NPN

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
Q301	2SC1740S(R,S)	TR. SI, NPN			
Q302	2SC1740S(R,S)	TR. SI, NPN			
Q303	2SC1740S(R,S)	TR. SI, NPN			
Q304	2SC1740S(R,S)	TR. SI, NPN			
Q305	2SA933S(R,S)	TR. SI, PNP			
Q306	2SA1005(K)	TR. SI, PNP			
Q307	2SA1005(K)	TR. SI, PNP			
Q308	2SC1740S(R,S)	TR. SI, NPN			
Q309	2SC1740S(R,S)	TR. SI, NPN			
Q310	2SA933S(R,S)	TR. SI, PNP			
Q311	2SA933S(R,S)	TR. SI, PNP			
Q312	2SC1740S(R,S)	TR. SI, NPN			
Q313	2SC1740S(R,S)	TR. SI, NPN			
Q314	2SC1907	TR. SI, NPN			
Q315	2SC1907	TR. SI, NPN			
Q316	2SA1459(K)	TR. SI, PNP			
Q317	2SA1459(K)	TR. SI, PNP			
Q318	2SC1907	TR. SI, NPN			
Q319	2SC1907	TR. SI, NPN			
Q320	2SC4732(E)	TR. SI, NPN			
Q321	2SC4732(E)	TR. SI, NPN			
Q322	2SA1828(E)	TR. SI, PNP			
Q323	2SA1828(E)	TR. SI, PNP			
Q324	2SA933S(R,S)	TR. SI, PNP			
Q401	2SA1499(P)	TR. SI, PNP			
Q402	2SC2551(O)	TR. SI, NPN			
Q403	2SA1304	TR. SI, PNP			
Q404	2SC2551(O)	TR. SI, NPN			
Q405	2SB1015(Y)	TR. SI, PNP			
Q406	2SD1406(Y)	TR. SI, NPN			
Q407	2SB1015(Y)	TR. SI, PNP			
R1	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R2	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R3	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R4	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R5	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R6	RD14BB2C822J	RES. CARBON	8.2K	5%	1/6W
R7	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R8	RD14BB2C181J	RES. CARBON	180	5%	1/6W
R9	RD14BB2C105J	RES. CARBON	1M	5%	1/6W
R10	RD14BB2C105J	RES. CARBON	1M	5%	1/6W
R11	RD14BB2C105J	RES. CARBON	1M	5%	1/6W
R12	RD14BB2C105J	RES. CARBON	1M	5%	1/6W
R13	NO USE				
R14	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R15	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R16	RD14BB2C751J	RES. CARBON	750	5%	1/6W
R17	RD14BB2C821J	RES. CARBON	820	5%	1/6W
R18	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R19	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R20	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R21	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R22	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R23	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R24	RD14BB2C622J	RES. CARBON	6.2K	5%	1/6W
R25	RD14BB2C512J	RES. CARBON	5.1K	5%	1/6W
R26	RD14BB2C331J	RES. CARBON	330	5%	1/6W
R27	RD14BB2C750J	RES. CARBON	75	5%	1/6W
R28	RD14BB2C750J	RES. CARBON	75	5%	1/6W
R29	RD14BB2C680J	RES. CARBON	68	5%	1/6W
R30	RD14BB2C390J	RES. CARBON	39	5%	1/6W
R31	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R32	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R33	RD14BB2C681J	RES. CARBON	680	5%	1/6W
R34	NO USE				
R35	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R36	NO USE				
R37	RD14BB2C391J	RES. CARBON	390	5%	1/6W
R38	RD14BB2C751J	RES. CARBON	750	5%	1/6W
R39	R90-0660-05	RES. NETWORK	4X1K		
R40	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R41	RD14BB2C683J	RES. CARBON	68K	5%	1/6W
R42	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R43	RD14BB2C393J	RES. CARBON	39K	5%	1/6W
R44	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R45	RD14BB2C163J	RES. CARBON	16K	5%	1/6W
R46	RD14BB2C752J	RES. CARBON	7.5K	5%	1/6W
R47	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R48	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R49	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R50	RD14BB2C393J	RES. CARBON	39K	5%	1/6W
R51	RD14BB2C123J	RES. CARBON	12K	5%	1/6W
R52	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R53	RD14BB2C113J	RES. CARBON	11K	5%	1/6W
R54	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R55	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R56	RD14BB2C182J	RES. CARBON	1.8K	5%	1/6W
R57	RD14BB2C272J	RES. CARBON	2.7K	5%	1/6W
R58	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R59	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R60	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R61	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R62	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R63	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R64	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R65	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R66	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R67	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R68	RD14BB2C105J	RES. CARBON	1M	5%	1/6W
R69	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R70	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R71	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R72	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R73	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R74	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R75	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R76	NO USE				
R77	RD14BB2C752J	RES. CARBON	7.5K	5%	1/6W
R78	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R79	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R80	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R81	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R82	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R83	RD14BB2E223J	RES. CARBON	22K	5%	1/4W
R84	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R85	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R86	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R87	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R88	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R89	NO USE				
R90	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R91	RD14BB2C203J	RES. CARBON	20K	5%	1/6W
R101	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R102	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R103	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R104	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R105	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R106	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R107	RD14BB2C912J	RES. CARBON	9.1K	5%	1/6W
R108	RD14BB2C163J	RES. CARBON	16K	5%	1/6W
R109	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R110	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R111	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R112	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R113	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R114	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R115	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R116	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R117	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R118	RD14BB2C162J	RES. CARBON	1.6K	5%	1/6W
R119	RD14BB2C243J	RES. CARBON	24K	5%	1/6W
R120	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R121	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R122	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R123	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R124	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R125	RD14BB2C330J	RES. CARBON	33	5%	1/6W
R126	RD14BB2C120J	RES. CARBON	12	5%	1/6W
R127	RD14BB2E222J	RES. CARBON	2.2K	5%	1/4W
R128	RD14BB2E471J	RES. CARBON	470	5%	1/4W
R129	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R130	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R131	RD14BB2C912J	RES. CARBON	9.1K	5%	1/6W
R132	RD14BB2C163J	RES. CARBON	16K	5%	1/6W
R133	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R134	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R135	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R136	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R137	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R138	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R139	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R140	RD14BB2C622J	RES. CARBON	6.2K	5%	1/6W
R141	RD14BB2C471J	RES. CARBON	470	5%	1/6W
R142	NO USE				
R143	RD14BB2C302J	RES. CARBON	3K	5%	1/6W
R144	RD14BB2C302J	RES. CARBON	3K	5%	1/6W
R145	RD14BB2C131J	RES. CARBON	130	5%	1/6W
R146	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R147	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R148	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R149	RD14BB2C183J	RES. CARBON	18K	5%	1/6W
R150	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R151	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R152	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R153	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R154	RD14BB2C684J	RES. CARBON	680K	5%	1/6W
R155	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R156	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R157	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R158	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R159	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R160	RD14BB2C202J	RES. CARBON	2K	5%	1/6W
R161	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R162	RD14BB2C202J	RES. CARBON	2K	5%	1/6W
R163	RD14BB2C151J	RES. CARBON	150	5%	1/6W
R164	RD14BB2C111J	RES. CARBON	110	5%	1/6W
R165	RD14BB2C681J	RES. CARBON	680	5%	1/6W
R166	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R167	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R168	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R169	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R170	RD14BB2C103J	RES. CARBON	10K	5%	1/6W

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
R171	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R172	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R173	RD14BB2C431J	RES. CARBON	430	5%	1/6W
R174	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R175	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R176	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R177	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R178	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R179	RD14BB2C242J	RES. CARBON	2.4K	5%	1/6W
R180	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R181	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R182	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R183	RD14BB2E102J	RES. CARBON	1K	5%	1/4W
R184	RD14BB2C621J	RES. CARBON	620	5%	1/6W
R185	RD14BB2E103J	RES. CARBON	10K	5%	1/4W
R186	RD14BB2C202J	RES. CARBON	2K	5%	1/6W
R187	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R188	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R189	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R190	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R191	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R192	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R193	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R194	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R195	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R196	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R197	RD14BB2E101J	RES. CARBON	100	5%	1/4W
R198	RD14BB2C471J	RES. CARBON	470	5%	1/6W
R199	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R202	RD14BB2C113J	RES. CARBON	11K	5%	1/6W
R203	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R204	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R205	NO USE				
R206	RD14BB2C432J	RES. CARBON	4.3K	5%	1/6W
R207	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R208	RD14BB2C512J	RES. CARBON	5.1K	5%	1/6W
R209	RD14BB2C202J	RES. CARBON	2K	5%	1/6W
R210	RD14BB2C333J	RES. CARBON	33K	5%	1/6W
R214	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R215	RD14BB2C431J	RES. CARBON	430	5%	1/6W
R216	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R217	NO USE				
R218	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R219	RD14BB2C134J	RES. CARBON	130K	5%	1/6W
R220	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R221	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R222	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R223	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R224	RD14BB2C562J	RES. CARBON	5.6K	5%	1/6W
R225	RD14BB2C134J	RES. CARBON	130K	5%	1/6W
R226	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R227	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R228	RD14BB2C753J	RES. CARBON	75K	5%	1/6W
R229	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R230	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R231	RD14BB2C562J	RES. CARBON	5.6K	5%	1/6W
R232	RD14BB2C134J	RES. CARBON	130K	5%	1/6W
R233	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R234	RD14BB2C474J	RES. CARBON	470K	5%	1/6W
R235	RD14BB2C474J	RES. CARBON	470K	5%	1/6W
R236	R92-1563-05	RES. METALGLACE	10M	5%	1/4W
R237	R92-1563-05	RES. METALGLACE	10M	5%	1/4W
R238	R92-1562-05	RES. METALGLACE	8.2M	5%	1/4W
R239	R92-1561-05	RES. METALGLACE	3.9M	5%	1/4W
R240	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R241	RD14BB2C474J	RES. CARBON	470K	5%	1/6W
R242	RD14BB2C683J	RES. CARBON	68K	5%	1/6W
R243	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R244	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R245	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R246	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R247	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R248	RN14BK2C1203F	RES. METAL FILM	120K	1%	1/6W
R249	R92-1564-05	RES. METALGLACE	15M	1%	1/2W
R250	RD14BB2C124J	RES. CARBON	120K	5%	1/6W
R251	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R252	RD14BB2C392J	RES. CARBON	3.9K	5%	1/6W
R253	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R254	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R255	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R256	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R257	RD14BB2C151J	RES. CARBON	150	5%	1/6W
R258	RD14BB2C302J	RES. CARBON	3K	5%	1/6W
R259	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R260	RN14BK2C1801F	RES. METAL FILM	1.8K	1%	1/6W
R261	RN14BK2C1801F	RES. METAL FILM	1.8K	1%	1/6W
R262	RD14BB2C362J	RES. CARBON	3.6K	5%	1/6W
R263	RD14BB2C562J	RES. CARBON	5.6K	5%	1/6W
R264	RD14BB2C303J	RES. CARBON	30K	5%	1/6W
R265	RD14BB2C562J	RES. CARBON	5.6K	5%	1/6W
R266	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R267	RD14BB2C224J	RES. CARBON	220K	5%	1/6W
R268	RD14BB2C204J	RES. CARBON	200K	5%	1/6W
R269	R92-1573-05	RES. LINEAR PCT	2.7K	5%	1/6W

REF.NO	PARTS NO	NAME & DESCRIPTION			
R300	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R301	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R302	RD14BB2C821J	RES. CARBON	820	5%	1/6W
R303	RD14BB2C821J	RES. CARBON	820	5%	1/6W
R304	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R305	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R306	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R307	RD14BB2C202J	RES. CARBON	2K	5%	1/6W
R308	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R309	RD14BB2C242J	RES. CARBON	2.4K	5%	1/6W
R310	RD14BB2C242J	RES. CARBON	2.4K	5%	1/6W
R311	RD14BB2C362J	RES. CARBON	3.6K	5%	1/6W
R312	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R313	RD14BB2C182J	RES. CARBON	1.8K	5%	1/6W
R314	RD14BB2C432J	RES. CARBON	4.3K	5%	1/6W
R315	RD14BB2C132J	RES. CARBON	1.3K	5%	1/6W
R316	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R317	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R318	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R319	RD14BB2C202J	RES. CARBON	2K	5%	1/6W
R320	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R321	RD14BB2C183J	RES. CARBON	18K	5%	1/6W
R322	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R323	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R324	RD14BB2C242J	RES. CARBON	2.4K	5%	1/6W
R325	RD14BB2C912J	RES. CARBON	9.1K	5%	1/6W
R326	RD14BB2C301J	RES. CARBON	300	5%	1/6W
R327	RD14BB2C391J	RES. CARBON	390	5%	1/6W
R328	RD14BB2C391J	RES. CARBON	390	5%	1/6W
R329	RD14BB2C390J	RES. CARBON	39	5%	1/6W
R330	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R331	RD14BB2C271J	RES. CARBON	270	5%	1/6W
R332	RD14BB2C132J	RES. CARBON	1.3K	5%	1/6W
R333	RD14BB2C432J	RES. CARBON	4.3K	5%	1/6W
R334	RD14BB2C432J	RES. CARBON	4.3K	5%	1/6W
R335	RD14BB2C243J	RES. CARBON	24K	5%	1/6W
R336	RD14BB2C243J	RES. CARBON	24K	5%	1/6W
R337	RD14BB2C241J	RES. CARBON	240	5%	1/6W
R338	RD14BB2C241J	RES. CARBON	240	5%	1/6W
R339	NO USE				
R340	RN14BK2C8200F	RES. METAL FILM	820	1%	1/6W
R341	RN14BK2C8200F	RES. METAL FILM	820	1%	1/6W
R342	RD14BB2C912J	RES. CARBON	9.1K	5%	1/6W
R343	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R344	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R345	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R346	RD14BB2C561J	RES. CARBON	560	5%	1/6W
R347	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R348	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R349	R92-1552-05	RES. LINEAR PCT	180		
R350	RD14BB2C163J	RES. CARBON	16K	5%	1/6W
R351	NO USE				
R352	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R353	RD14BB2C242J	RES. CARBON	2.4K	5%	1/6W
R354	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R355	RD14BB2C391J	RES. CARBON	390	5%	1/6W
R356	NO USE				
R357	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R358	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R359	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R360	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R361	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R362	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R363	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R364	RN14BK2C3901F	RES. METAL FILM	3.9K	1%	1/6W
R365	RN14BK2C6201F	RES. METAL FILM	6.2K	1%	1/6W
R366	R92-1560-05	RES. LINEAR PCT	2K		
R367	RD14BB2C393J	RES. CARBON	39K	5%	1/6W
R368	RD14BB2C622J	RES. CARBON	6.2K	5%	1/6W
R369	RD14BB2C204J	RES. CARBON	200K	5%	1/6W
R370	RD14BB2C302J	RES. CARBON	3K	5%	1/6W
R371	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R372	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R373	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R374	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R375	RD14BB2C362J	RES. CARBON	3.6K	5%	1/6W
R376	RD14BB2C362J	RES. CARBON	3.6K	5%	1/6W
R377	R92-1558-05	RES. SPECIAL POWER	39K	5%	1W
R378	R92-1558-05	RES. SPECIAL POWER	39K	5%	1W
R381	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R382	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R383	RD14BB2C751J	RES. CARBON	750	5%	1/6W
R384	RD14BB2C751J	RES. CARBON	750	5%	1/6W
R385	RN14BK2C6801F	RES. METAL FILM	6.8K	1%	1/6W
R386	RN14BK2C1303F	RES. METAL FILM	130K	1%	1/6W
R387	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R388	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R389	NO USE				
R390	RD14BB2C913J	RES. CARBON	91K	5%	1/6W
R394	R92-1559-05	RES. SPECIAL POWER	47K	5%	1W
R395	R92-1559-05	RES. SPECIAL POWER	47K	5%	1W
R396	RD14BB2C431J	RES. CARBON	430	5%	1/6W
R397	RD14BB2C162J	RES. CARBON	1.6K	5%	1/6W
R398	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R399	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R400	NO USE				

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION
R401	R92-1557-05	RES. SPECIAL POWER 6.8K 5% 2W
R402	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R403	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R404	R92-1556-05	RES. SPECIAL POWER 1K 5% 2W
R405	R92-1556-05	RES. SPECIAL POWER 1K 5% 2W
R406	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R407	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R408	R92-1555-05	RES. SPECIAL POWER 56 5% 2W
R409	R92-1555-05	RES. SPECIAL POWER 56 5% 2W
R410	R92-1555-05	RES. SPECIAL POWER 56 5% 2W
R411	R92-1555-05	RES. SPECIAL POWER 56 5% 2W
R412	R92-1555-05	RES. SPECIAL POWER 56 5% 2W
R413	R92-1555-05	RES. SPECIAL POWER 56 5% 2W
R414	R92-1554-05	RES. SPECIAL POWER 15 5% 2W
R415	RD14BB2C472J	RES. CARBON 4.7K 5% 1/6W
R416	RD14BB2C302J	RES. CARBON 3K 5% 1/6W
R417	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
TC101	C05-0470-05	CAP. TRIMMER 20P
TC102	C05-0470-05	CAP. TRIMMER 20P
TC303	C05-0490-05	CAP. TRIMMER 20P
TH301	112-103-2FM	THERMISTOR
U1	TC4053BP	IC,TRIPLE 2-CH MPX/DE-MPX
U2	NJM072BD	IC,JFET INPUT OP AMP
U3	MC10102L	IC,QUAD 2-INPUT NOR GATE
U4	KMS01	IC,LINEAR
U101	MC10131L	IC,DUAL D-FLIP FLOP
U102	KMD05	IC,LINEAR
U103	SN74ALS74AN	IC,DUAL D-F.F. (WITH PR&CLR)
U104	KMS01	IC,LINEAR
U105	KMD05	IC,LINEAR
U106	SN74ALS02N	IC,QUAD 2 INPUT NOR
U107	KMS01	IC,LINEAR
U108	SN74ALS74AN	IC,DUAL D-F.F. (WITH PR&CLR)
U109	TC74HC4053AP	IC,TRIPLE 2-CH ANALOG MPX
U201	NJM4558D	IC,DUAL OP-AMP
U301	TC74HC4053AP	IC,TRIPLE 2-CH ANALOG MPX
U302	KMG01	IC,LINEAR
U401	KMA02	IC,LINEAR
VR1	R12-0680-05	RES. SEMI FIXED 47K
VR2	R12-0680-05	RES. SEMI FIXED 47K
VR102	R12-0694-05	RES. SEMI FIXED 4.7KB
VR103	R12-0680-05	RES. SEMI FIXED 47K
VR104	R12-1860-05	RES. SEMI FIXED 1KB
VR201	R12-5545-05	RES. SEMI FIXED 2.2MB
VR202	R12-6507-05	RES. SEMI FIXED 470K
VR301	R12-0680-05	RES. SEMI FIXED 47K
VR302	R12-0882-05	RES. SEMI FIXED 100 B
VR303	R12-0678-05	RES. SEMI FIXED 10KB
VR304	R12-0694-05	RES. SEMI FIXED 4.7KB
VR305	R12-6501-05	RES. SEMI FIXED 470KB
VR306	R12-0680-05	RES. SEMI FIXED 47K
VR307	R12-0680-05	RES. SEMI FIXED 47K
VR308	R12-0890-05	RES. SEMI FIXED 470 B
VR309	R12-0883-05	RES. SEMI FIXED 220 B
W201	W02-2256-05	HIGH VOLTAGE BLOCK

CS-5235 HORIZONTAL UNIT

X74-1580-01

REF.NO	PARTS NO	NAME & DESCRIPTION
	E23-0149-05	GND TERMINAL
	E23-0557-14	EARTH LUG,THERMAL FUSE
	F01-0867-05	HEAT SINK,HIGH VOLTAGE
	F01-2316-05	HEAT SINK,POWER
	J73-0284-22	PCB (UNMOUNTED)
	N09-0623-04	SCREW,SEMS PAN HD M3X8
C1	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C2	NO USE	
C3	C91-2595-05	CAP. CERAMIC 68P 5% 50V
C4	CF92FV1H103J	CAP. POLYESTER 0.01 5% 50V
C5	C91-2596-05	CAP. CERAMIC 82P 5% 50V
C6	CC45FCH1H470J	CAP. CERAMIC 47P 5% 50V
C7	CC45FCH1H010C	CAP. CERAMIC 1P 0.25P 50V
C8	CC45FCH1H040C	CAP. CERAMIC 4P 0.25P 50V
C9	NO USE	
C10	CK45FB1H222K	CAP. CERAMIC 2200P 10% 50V
C11	C91-0757-05	CAP. CERAMIC 1000P 10% 50V
C12	C91-2538-05	CAP. MYLAR 0.1 63V
C13	C91-2593-05	CAP. CERAMIC 47P 5% 50V
C14	CC45FCH1H101J	CAP. CERAMIC 100P 5% 50V
C15	NO USE	
C16	CE04LW1E100M	CAP. ELECTRO 10 20% 25V
C17	CE04LW1H010M	CAP. ELECTRO 1 20% 50V
C18	CE04LW1H010M	CAP. ELECTRO 1 20% 50V
C19	CF92FV1H682J	CAP. POLYESTER 6800P 5% 50V
C20	CF92FV1H222J	CAP. POLYESTER 2200P 5% 50V
C21	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C22	CE04HW1H010M	CAP. ELECTRO 1 20% 50V
C23	CE04HW1H010M	CAP. ELECTRO 1 20% 50V
C24	NO USE	
C25	CE04LW1E100M	CAP. ELECTRO 10 20% 25V
C26	CF92FV1H684J	CAP. POLYESTER 0.68 5% 50V
C27	CF92FV1H684J	CAP. POLYESTER 0.68 5% 50V
C28	CE04HW1E220M	CAP. ELECTRO 22 20% 25V
C29	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C30	C91-2538-05	CAP. MYLAR 0.1 63V
C31	CE04LW0J331M	CAP. ELECTRO 330 20% 6.3V
C32	CE04EW1A101M	CAP. ELECTRO 100 20% 10V
C33	CC45FCH1H020C	CAP. CERAMIC 2P 0.25P 50V
C34	CE04LW1C331M	CAP. ELECTRO 330 20% 16V
C37	CC45FSL1H221J	CAP. CERAMIC 220P 5% 50V
C38	C91-0745-05	CAP. CERAMIC 100P 10% 50V
C39	C91-0745-05	CAP. CERAMIC 100P 10% 50V
C101	CC45FCH1H470J	CAP. CERAMIC 47P 5% 50V
C102	CC45FCH1H470J	CAP. CERAMIC 47P 5% 50V
C103	CF92FV1H332J	CAP. POLYESTER 3300P 5% 50V
C104	C91-2582-05	CAP. POLYESTER 0.47 5% 100V
C105	CC45FCH1H220J	CAP. CERAMIC 22P 5% 50V
C106	CK45FB1H102K	CAP. CERAMIC 1000P 10% 50V
C107	CE04HW1H2R2M	CAP. ELECTRO 2.2 20% 50V
C108	CC45FCH1H101J	CAP. CERAMIC 100P 5% 50V
C109	NO USE	
C110	CC45FCH1H470J	CAP. CERAMIC 47P 5% 50V
C111	CF92FV1H104J	CAP. POLYESTER 0.1 5% 50V
C112	CC45FCH1H220J	CAP. CERAMIC 22P 5% 50V
C113	CC45FCH1H330J	CAP. CERAMIC 33P 5% 50V
C114	CE04LW1A220M	CAP. ELECTRO 22 20% 10V
C115	C91-2604-05	CAP. CERAMIC 390P 5% 50V
C116	C91-2598-05	CAP. CERAMIC 120P 5% 50V
C117	CC45FCH1H680J	CAP. CERAMIC 68P 5% 50V
C118	CC45FCH1H680J	CAP. CERAMIC 68P 5% 50V
C119	NO USE	
C120	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C121	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C122	CC45FCH1H390J	CAP. CERAMIC 39P 5% 50V
C123	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C124	C91-2582-05	CAP. POLYESTER 0.47 5% 100V
C125	CE04LW0J331M	CAP. ELECTRO 330 20% 6.3V
C126	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C127	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C128	C91-2538-05	CAP. MYLAR 0.1 63V
C129	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C132	CC45FCH1H030C	CAP. CERAMIC 3P 0.25P 50V
C135	CE04LW0J331M	CAP. ELECTRO 330 20% 6.3V
C136	CE04LW0J331M	CAP. ELECTRO 330 20% 6.3V
C137	CE04LW0J331M	CAP. ELECTRO 330 20% 6.3V
C138	CE04LW1C101M	CAP. ELECTRO 100 20% 16V
C139	CC45FSL1H331J	CAP. CERAMIC 330P 5% 50V
C140	CC45FCH1H470J	CAP. CERAMIC 47P 5% 50V
C141	CC45FCH1H470J	CAP. CERAMIC 47P 5% 50V
C142	CC45FCH1H470J	CAP. CERAMIC 47P 5% 50V
C143	C91-0737-05	CAP. CERAMIC 47P 5% 50V
C144	C91-0737-05	CAP. CERAMIC 47P 5% 50V
C145	CE04LW1C100M	CAP. ELECTRO 10 20% 16V
C146	CC45FSL1H030C	CAP. CERAMIC 3P 0.25P 50V
C201	CC45FCH1H070D	CAP. CERAMIC 7P 0.5P 50V
C202	NO USE	
C203	CC45FCH1H120J	CAP. CERAMIC 12P 5% 50V
C204	NO USE	
C205	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C206	NO USE	
C207	CK45FB2H472K	CAP. CERAMIC 4700P 10% 500V
C208	CE04W2E010M	CAP. ELECTRO 1 20% 250V
C209	CC45FCH2H020C	CAP. CERAMIC 2P 0.25P 500V
C210	CK45FB2H472K	CAP. CERAMIC 4700P 10% 500V
C211	CE04W2E010M	CAP. ELECTRO 1 20% 250V
C212	CE04W2E010M	CAP. ELECTRO 1 20% 250V
C213	CK45FB2H102K	CAP. CERAMIC 1000P 10% 500V
C214	CK45FB2H102K	CAP. CERAMIC 1000P 10% 500V
C215	C91-1317-05	CAP. CERAMIC 0.01 80/-20% 2K
C216	C91-1317-05	CAP. CERAMIC 0.01 80/-20% 2K
C217	C91-1317-05	CAP. CERAMIC 0.01 80/-20% 2K
C218	CE04W2E010M	CAP. ELECTRO 1 20% 250V
C219	NO USE	
C220	C91-1317-05	CAP. CERAMIC 0.01 80/-20% 2K
C221	C91-1317-05	CAP. CERAMIC 0.01 80/-20% 2K
C222	CE04LW1E221M	CAP. ELECTRO 220 20% 25V
C223	CE04LW1H101M	CAP. ELECTRO 100 20% 50V
C224	CK45FB1H472K	CAP. CERAMIC 4700P 10% 50V
C227	CC45FCH2H101J	CAP. CERAMIC 100P 5% 500V
C228	CK45FB1H222K	CAP. CERAMIC 2200P 10% 50V
C229	C91-1317-05	CAP. CERAMIC 0.01 80/-20% 2K

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
C230	CK45E3D102P	CAP. CERAMIC	1000P		2KV
C231	C91-2581-05	CAP. CERAMIC	0.01	5%	2KV
C232	CE04W2E010M	CAP. ELECTRO	1	20%	250V
C233	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C234	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C301	CC45FCH1H101J	CAP. CERAMIC	100P	5%	50V
C302	CC45FSL1H331J	CAP. CERAMIC	330P	5%	50V
C303	C91-0713-05	CAP. CERAMIC	2.2	10%	50V
C306	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C307	C91-2585-05	CAP. MYLAR	0.01	10%	250V
C308	C91-2587-05	CAP. MYLAR	0.1	10%	250V
C309	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C310	C91-2587-05	CAP. MYLAR	0.1	10%	250V
C311	C91-2585-05	CAP. MYLAR	0.01	10%	250V
C314	CK45FB2H152K	CAP. CERAMIC	1500P	10%	500V
C315	NO USE				
C316	CE04LW0J331M	CAP. ELECTRO	330	20%	6.3V
C317	NO USE				
C318	CC45FCH1H020C	CAP. CERAMIC	2P	0.25P	50V
C319	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C320	NO USE				
C321	C91-0769-05	CAP. CERAMIC	0.01	20%	16V
C322	CE04LW1A221M	CAP. ELECTRO	220	20%	10V
C323	CC45FCH1H150J	CAP. CERAMIC	15P	5%	50V
C324	CE04LW0J331M	CAP. ELECTRO	330	20%	6.3V
C325	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C401	CE04W2E470M	CAP. ELECTRO	47	20%	250V
C402	CE04W2E100M	CAP. ELECTRO	10	20%	250V
C403	CE04LW1E220M	CAP. ELECTRO	22	20%	25V
C404	CE04EW2A471M	CAP. ELECTRO	470	20%	100V
C405	CE04LW2A220M	CAP. ELECTRO	22	20%	100V
C406	CE04EW1E472M	CAP. ELECTRO	4700	20%	25V
C407	CE04LW1C331M	CAP. ELECTRO	330	20%	16V
C408	CE04EW1E472M	CAP. ELECTRO	4700	20%	25V
C409	CE04EW1C332M	CAP. ELECTRO	3300	20%	16V
C410	CE04LW0J471M	CAP. ELECTRO	470	20%	6.3V
C411	CE04LW1C331M	CAP. ELECTRO	330	20%	16V
C412	CE04LW0J331M	CAP. ELECTRO	330	20%	6.3V
C413	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C414	CE04LW1C101M	CAP. ELECTRO	100	20%	16V
C415	CE04EW1E102M	CAP. ELECTRO	1000	20%	25V
C416	CE04EW1E102M	CAP. ELECTRO	1000	20%	25V
C417	C91-0761-05	CAP. CERAMIC	2200P	20%	50V
C418	C91-0757-05	CAP. CERAMIC	1000P	10%	50V
C901	CF92V1H103J	CAP. POLYESTER	0.01	5%	50V
D1	MA700	DIODE			
D2	MA700	DIODE			
D3	MA700	DIODE			
D4	MA700	DIODE			
D5	MA700	DIODE			
D6	1SS132	DIODE			
D7	1SS132	DIODE			
D8	1SS132	DIODE			
D9	1SS132	DIODE			
D10	1SS132	DIODE			
D11	1SS132	DIODE			
D12	MA700	DIODE			
D13	1SS132	DIODE			
D14	1SS132	DIODE			
D15	1SS132	DIODE			
D16	1SS132	DIODE			
D17	1SS132	DIODE			
D18	1SS132	DIODE			
D101	1SS132	DIODE			
D102	1SS132	DIODE			
D103	1SS132	DIODE			
D104	1SS132	DIODE			
D105	1SS132	DIODE			
D106	1SS132	DIODE			
D107	1SS132	DIODE			
D108	1SS132	DIODE			
D109	MA700	DIODE			
D110	1SS132	DIODE			
D111	NO USE				
D112	1SS132	DIODE			
D113	1SS132	DIODE			
D114	MA700	DIODE			
D115	1SS132	DIODE			
D116	NO USE				
D117	1SS132	DIODE			
D118	1SS132	DIODE			
D119	1SS132	DIODE			
D120	1SS132	DIODE			
D121	1SS132	DIODE			
D122	1SS132	DIODE			
D123	1SS132	DIODE			
D124	1SS132	DIODE			
D125	1SS132	DIODE			
D126	1SS132	DIODE			
D127	1SS132	DIODE			
D128	1SS132	DIODE			

REF.NO	PARTS NO	NAME & DESCRIPTION		
D129	1SS132	DIODE		
D130	MA700	DIODE		
D131	NO USE			
D132	MA700	DIODE		
D133	MA700	DIODE		
D201	1SS132	DIODE		
D202	1SS132	DIODE		
D203	1SS83	DIODE		
D204	1SS83	DIODE		
D205	1SS83	DIODE		
D206	1SS83	DIODE		
D207	1SS83	DIODE		
D208	1SS83	DIODE		
D209	1SS83	DIODE		
D210	1SS83	DIODE		
D211	1SS132	DIODE		
D212	1SS132	DIODE		
D213	1SS132	DIODE		
D301	MA700	DIODE		
D302	1SS132	DIODE		
D303	MTZ3.0JA	DIODE,ZENER		
D304	1SS132	DIODE		
D305	1SS132	DIODE		
D306	MA700	DIODE		
D307	MA700	DIODE		
D308	TLR112	LED,RED		
D309	TLR112	LED,RED		
D312	MTZ5.1JB	DIODE,ZENER		
D313	1SS132	DIODE		
D314	NO USE			
D315	1SS132	DIODE		
D316	MTZ3.0JA	DIODE,ZENER		
D401	S1VB60	DIODE,STACK		
D402	S1VB60	DIODE,STACK		
D403	S4VB20F	DIODE,STACK		
D404	S1VB60	DIODE,STACK		
D405	1SS132	DIODE		
D406	1SS132	DIODE		
D407	MTZ13JC	DIODE,ZENER		
D408	MTZ13JC	DIODE,ZENER		
D409	MTZ7.5JA	DIODE,ZENER		
D801	MA700	DIODE		
F201	F53-0107-05	THERMAL FUSE	400MA/125V	
JW1	E38-1005-05	WIRE ASS'Y;3P		
JW2	E38-1006-05	WIRE ASS'Y;6P		
JW9	E38-0988-15	WIRE ASS'Y;H TO V		
JW14	E38-0989-05	WIRE ASS'Y;H TO FINAL		
JW18	E38-0990-05	WIRE ASS'Y;H TO CRT		
JW19	E38-0991-05	WIRE ASS'Y;H TO BNC		
K301	S76-0627-05	RELAY		
L101	L79-0553-05	NOISE FILTER		
L201	L40-1545-06	FERRI INDUCTOR	150MH	5%
L202	L40-1011-04	FERRI INDUCTOR	100UH	10%
L203	L40-1011-04	FERRI INDUCTOR	100UH	10%
L204	L40-3925-05	FERRI INDUCTOR	3.9MH	5%
L301	L40-1001-11	FERRI INDUCTOR	10UH	10%
NL201	NE-38B	NEON LAMP		
NL202	NE-38B	NEON LAMP		
NL203	NE-38B	NEON LAMP		
NL204	NE-38B	NEON LAMP		
P6	E40-7515-05	PIN CONNECTOR	3P	
P7	E40-7519-05	PIN CONNECTOR	4P	
P8	E40-7040-05	PIN CONNECTOR	13P	
P9	NO USE			
P10	E40-5066-05	PIN CONNECTOR	9P	
P15	E40-5067-05	PIN CONNECTOR	10P	
P16	E40-5069-05	PIN CONNECTOR	12P	
P17	E40-3306-05	PIN CONNECTOR	9P	
P20	E40-3299-05	PIN CONNECTOR	2P	
Q3	2SC1740S(R,S)	TR. SI, NPN		
Q4	2SC1923(O)	TR. SI, NPN		
Q5	2SC1923(O)	TR. SI, NPN		
Q6	2SC3779(D)	TR. SI, NPN		
Q7	2SC3779(D)	TR. SI, NPN		
Q8	NO USE			
Q9	2SA1459(K)	TR. SI, PNP		
Q10	2SC1740S(R,S)	TR. SI, NPN		
Q11	2SC1740S(R,S)	TR. SI, NPN		
Q12	2SA1005(K)	TR. SI, PNP		

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
Q13	2SC1740S(R,S)	TR. SI, NPN			
Q14	2SC1740S(R,S)	TR. SI, NPN			
Q15	2SA1005(K)	TR. SI, PNP			
Q16	2SA1005(K)	TR. SI, PNP			
Q17	2SA933S(R,S)	TR. SI, PNP			
Q18	2SA933S(R,S)	TR. SI, PNP			
Q19	2SC1740S(R,S)	TR. SI, NPN			
Q20	2SA933S(R,S)	TR. SI, PNP			
Q21	2SC1907	TR. SI, NPN			
Q28	2SA1459(K)	TR. SI, PNP			
Q101	2SK170(V)	FET, N-CHANNEL			
Q102	2SC1923(O)	TR. SI, NPN			
Q103	2SA933S(R,S)	TR. SI, PNP			
Q104	2SC1740S(R,S)	TR. SI, NPN			
Q105	2SC1740S(R,S)	TR. SI, NPN			
Q106	2SC1740S(R,S)	TR. SI, NPN			
Q107	2SK170(V)	FET, N-CHANNEL			
Q108	2SC1923(O)	TR. SI, NPN			
Q109	2SC3066(G)	TR. SI, NPN			
Q110	2SA1459(K)	TR. SI, PNP			
Q111	2SA933S(R,S)	TR. SI, PNP			
Q112	2SA933S(R,S)	TR. SI, PNP			
Q113	2SA1005(K)	TR. SI, PNP			
Q114	2SA1005(K)	TR. SI, PNP			
Q115	2SA1005(K)	TR. SI, PNP			
Q116	2SA1005(K)	TR. SI, PNP			
Q117	2SC1923(O)	TR. SI, NPN			
Q118	2SC1923(O)	TR. SI, NPN			
Q119	2SA933S(R,S)	TR. SI, PNP			
Q120	2SA1459(K)	TR. SI, PNP			
Q121	2SC1923(O)	TR. SI, NPN			
Q122	2SC1740S(R,S)	TR. SI, NPN			
Q123	2SC1740S(R,S)	TR. SI, NPN			
Q124	2SC1740S(R,S)	TR. SI, NPN			
Q125	2SC1740S(R,S)	TR. SI, NPN			
Q126	2SC1740S(R,S)	TR. SI, NPN			
Q127	2SA1005(K)	TR. SI, PNP			
Q151	2SA1459(K)	TR. SI, PNP			
Q152	2SA1459(K)	TR. SI, PNP			
Q158	2SA1459(K)	TR. SI, PNP			
Q201	2SA933S(R,S)	TR. SI, PNP			
Q202	NO USE				
Q203	2SC1923(O)	TR. SI, NPN			
Q204	2SC1740S(R,S)	TR. SI, NPN			
Q205	2SA933S(R,S)	TR. SI, PNP			
Q206	2SC2910(S)	TR. SI, NPN			
Q207	2SA1208(S)	TR. SI, PNP			
Q208	2SC2910(S)	TR. SI, NPN			
Q209	2SA1208(S)	TR. SI, PNP			
Q210	2SC2551(O)	TR. SI, NPN			
Q211	2SC2551(O)	TR. SI, NPN			
Q212	2SA933S(R,S)	TR. SI, PNP			
Q213	2SD613(E)	TR. SI, NPN			
Q301	2SC1740S(R,S)	TR. SI, NPN			
Q302	2SC1740S(R,S)	TR. SI, NPN			
Q303	2SC1740S(R,S)	TR. SI, NPN			
Q304	2SC1740S(R,S)	TR. SI, NPN			
Q305	2SA933S(R,S)	TR. SI, PNP			
Q306	2SA1005(K)	TR. SI, PNP			
Q307	2SA1005(K)	TR. SI, PNP			
Q313	2SC1740S(R,S)	TR. SI, NPN			
Q314	2SC1907	TR. SI, NPN			
Q315	2SC1907	TR. SI, NPN			
Q316	2SA1459(K)	TR. SI, PNP			
Q317	2SA1459(K)	TR. SI, PNP			
Q318	2SC1907	TR. SI, NPN			
Q319	2SC1907	TR. SI, NPN			
Q320	2SC4732(E)	TR. SI, NPN			
Q321	2SC4732(E)	TR. SI, NPN			
Q322	2SA1828(E)	TR. SI, PNP			
Q323	2SA1828(E)	TR. SI, PNP			
Q324	2SA933S(R,S)	TR. SI, PNP			
Q401	2SA1499(P)	TR. SI, PNP			
Q402	2SC2551(O)	TR. SI, NPN			
Q403	2SA1304	TR. SI, PNP			
Q404	2SC2551(O)	TR. SI, NPN			
Q405	2SB1015(Y)	TR. SI, PNP			
Q406	2SD1406(Y)	TR. SI, NPN			
Q407	2SB1015(Y)	TR. SI, PNP			
R1	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R2	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R3	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R4	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R5	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R6	RD14BB2C822J	RES. CARBON	8.2K	5%	1/6W
R7	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R8	RD14BB2C181J	RES. CARBON	180	5%	1/6W
R9	RD14BB2C105J	RES. CARBON	1M	5%	1/6W
R10	RD14BB2C105J	RES. CARBON	1M	5%	1/6W
R11	RD14BB2C105J	RES. CARBON	1M	5%	1/6W
R12	RD14BB2C105J	RES. CARBON	1M	5%	1/6W
R13	NO USE				
R14	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R15	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R16	RD14BB2C751J	RES. CARBON	750	5%	1/6W
R17	RD14BB2C821J	RES. CARBON	820	5%	1/6W
R18	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R19	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R20	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R21	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R22	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R23	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R24	RD14BB2C622J	RES. CARBON	6.2K	5%	1/6W
R25	RD14BB2C512J	RES. CARBON	5.1K	5%	1/6W
R26	RD14BB2C331J	RES. CARBON	330	5%	1/6W
R27	RD14BB2C750J	RES. CARBON	75	5%	1/6W
R28	RD14BB2C750J	RES. CARBON	75	5%	1/6W
R29	RD14BB2C680J	RES. CARBON	68	5%	1/6W
R30	RD14BB2C390J	RES. CARBON	39	5%	1/6W
R31	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R32	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R33	RD14BB2C681J	RES. CARBON	680	5%	1/6W
R34	NO USE				
R35	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R36	NO USE				
R37	RD14BB2C391J	RES. CARBON	390	5%	1/6W
R38	RD14BB2C751J	RES. CARBON	750	5%	1/6W
R39	R90-0660-05	RES. NETWORK	4X1K		
R40	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R41	RD14BB2C683J	RES. CARBON	68K	5%	1/6W
R42	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R43	RD14BB2C393J	RES. CARBON	39K	5%	1/6W
R44	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R45	RD14BB2C163J	RES. CARBON	16K	5%	1/6W
R46	RD14BB2C752J	RES. CARBON	7.5K	5%	1/6W
R47	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R48	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R49	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R50	RD14BB2C393J	RES. CARBON	39K	5%	1/6W
R51	RD14BB2C123J	RES. CARBON	12K	5%	1/6W
R52	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R53	RD14BB2C113J	RES. CARBON	11K	5%	1/6W
R54	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R55	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R56	RD14BB2C182J	RES. CARBON	1.8K	5%	1/6W
R57	RD14BB2C272J	RES. CARBON	2.7K	5%	1/6W
R58	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R59	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R60	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R61	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R62	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R63	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R64	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R65	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R66	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R67	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R68	RD14BB2C105J	RES. CARBON	1M	5%	1/6W
R69	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R70	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R71	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R72	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R73	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R74	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R75	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R76	NO USE				
R77	RD14BB2C752J	RES. CARBON	7.5K	5%	1/6W
R78	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R79	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R80	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R81	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R82	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R83	RD14BB2E223J	RES. CARBON	22K	5%	1/4W
R84	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R85	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R86	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R87	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R88	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R89	NO USE				
R90	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R91	RD14BB2C203J	RES. CARBON	20K	5%	1/6W
R101	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R102	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R103	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R104	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R105	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R106	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R107	RD14BB2C912J	RES. CARBON	9.1K	5%	1/6W
R108	RD14BB2C163J	RES. CARBON	16K	5%	1/6W
R109	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R110	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R111	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R112	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R113	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R114	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R115	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R116	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R117	RD14BB2C473J	RES. CARBON	47K	5%	1/6W

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
R118	RD14BB2C162J	RES. CARBON	1.6K	5%	1/6W
R119	RD14BB2C243J	RES. CARBON	24K	5%	1/6W
R120	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R121	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R122	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R123	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R124	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R125	RD14BB2C330J	RES. CARBON	33	5%	1/6W
R126	RD14BB2C120J	RES. CARBON	12	5%	1/6W
R127	RD14BB2E222J	RES. CARBON	2.2K	5%	1/4W
R128	RD14BB2E471J	RES. CARBON	470	5%	1/4W
R129	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R130	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R131	RD14BB2C912J	RES. CARBON	9.1K	5%	1/6W
R132	RD14BB2C163J	RES. CARBON	16K	5%	1/6W
R133	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R134	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R135	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R136	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R137	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R138	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R139	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R140	RD14BB2C622J	RES. CARBON	6.2K	5%	1/6W
R141	RD14BB2C471J	RES. CARBON	470	5%	1/6W
R142	NO USE				
R143	RD14BB2C302J	RES. CARBON	3K	5%	1/6W
R144	RD14BB2C302J	RES. CARBON	3K	5%	1/6W
R145	RD14BB2C131J	RES. CARBON	130	5%	1/6W
R146	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R147	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R148	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R149	RD14BB2C183J	RES. CARBON	18K	5%	1/6W
R150	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R151	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R152	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R153	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R154	RD14BB2C684J	RES. CARBON	680K	5%	1/6W
R155	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R156	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R157	NO USE				
R158	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R159	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R160	RD14BB2C202J	RES. CARBON	2K	5%	1/6W
R161	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R162	RD14BB2C202J	RES. CARBON	2K	5%	1/6W
R163	RD14BB2C151J	RES. CARBON	150	5%	1/6W
R164	RD14BB2C111J	RES. CARBON	110	5%	1/6W
R165	RD14BB2C681J	RES. CARBON	680	5%	1/6W
R166	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R167	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R168	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R169	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R170	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R171	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R172	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R173	RD14BB2C431J	RES. CARBON	430	5%	1/6W
R174	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R175	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R176	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R177	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R178	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R179	RD14BB2C242J	RES. CARBON	2.4K	5%	1/6W
R180	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R181	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R182	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R183	RD14BB2E102J	RES. CARBON	1K	5%	1/4W
R184	RD14BB2C621J	RES. CARBON	620	5%	1/6W
R185	RD14BB2E103J	RES. CARBON	10K	5%	1/4W
R186	RD14BB2C202J	RES. CARBON	2K	5%	1/6W
R187	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R188	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R189	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R190	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R191	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R192	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R193	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R194	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R195	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R196	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R197	RD14BB2E101J	RES. CARBON	100	5%	1/4W
R198	RD14BB2C471J	RES. CARBON	470	5%	1/6W
R199	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R202	RD14BB2C113J	RES. CARBON	11K	5%	1/6W
R206	RD14BB2C432J	RES. CARBON	4.3K	5%	1/6W
R207	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R210	RD14BB2C333J	RES. CARBON	33K	5%	1/6W
R214	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R215	RD14BB2C431J	RES. CARBON	430	5%	1/6W
R216	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R217	NO USE				
R218	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R219	RD14BB2C134J	RES. CARBON	130K	5%	1/6W
R220	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R221	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R222	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R223	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R224	RD14BB2C562J	RES. CARBON	5.6K	5%	1/6W
R225	RD14BB2C134J	RES. CARBON	130K	5%	1/6W
R226	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R227	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R228	RD14BB2C753J	RES. CARBON	75K	5%	1/6W
R229	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R230	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R231	RD14BB2C562J	RES. CARBON	5.6K	5%	1/6W
R232	RD14BB2C134J	RES. CARBON	130K	5%	1/6W
R233	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R234	RD14BB2C474J	RES. CARBON	470K	5%	1/6W
R235	RD14BB2C474J	RES. CARBON	470K	5%	1/6W
R236	R92-1563-05	RES. METALGLACE	10M	5%	1/4W
R237	R92-1563-05	RES. METALGLACE	10M	5%	1/4W
R238	R92-1562-05	RES. METALGLACE	8.2M	5%	1/4W
R239	R92-1561-05	RES. METALGLACE	3.9M	5%	1/4W
R240	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R241	RD14BB2C474J	RES. CARBON	470K	5%	1/6W
R242	RD14BB2C683J	RES. CARBON	68K	5%	1/6W
R243	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R244	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R245	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R246	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R247	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R248	RN14BK2C1203F	RES. METAL FILM	120K	1%	1/6W
R249	R92-1564-05	RES. METALGLACE	15M	1%	1/2W
R250	RD14BB2C124J	RES. CARBON	120K	5%	1/6W
R251	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R252	RD14BB2C392J	RES. CARBON	3.9K	5%	1/6W
R253	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R254	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R255	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R256	NO USE				
R257	RD14BB2C151J	RES. CARBON	150	5%	1/6W
R258	RD14BB2C302J	RES. CARBON	3K	5%	1/6W
R259	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R260	RN14BK2C1801F	RES. METAL FILM	1.8K	1%	1/6W
R261	RN14BK2C1801F	RES. METAL FILM	1.8K	1%	1/6W
R262	RD14BB2C362J	RES. CARBON	3.6K	5%	1/6W
R263	RD14BB2C562J	RES. CARBON	5.6K	5%	1/6W
R264	RD14BB2C303J	RES. CARBON	30K	5%	1/6W
R265	RD14BB2C562J	RES. CARBON	5.6K	5%	1/6W
R266	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R267	RD14BB2C224J	RES. CARBON	220K	5%	1/6W
R268	RD14BB2C204J	RES. CARBON	200K	5%	1/6W
R269	R92-1573-05	RES. LINEAR PCT	2.7K	5%	1/6W
R300	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R301	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R302	RD14BB2C821J	RES. CARBON	820	5%	1/6W
R303	RD14BB2C821J	RES. CARBON	820	5%	1/6W
R304	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R305	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R306	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R307	RD14BB2C202J	RES. CARBON	2K	5%	1/6W
R308	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R309	RD14BB2C242J	RES. CARBON	2.4K	5%	1/6W
R310	RD14BB2C242J	RES. CARBON	2.4K	5%	1/6W
R311	RD14BB2C362J	RES. CARBON	3.6K	5%	1/6W
R312	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R313	RD14BB2C182J	RES. CARBON	1.8K	5%	1/6W
R314	RD14BB2C432J	RES. CARBON	4.3K	5%	1/6W
R315	RD14BB2C132J	RES. CARBON	1.3K	5%	1/6W
R316	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R317	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R318	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R319	RD14BB2C202J	RES. CARBON	2K	5%	1/6W
R320	RD14BB2C682J	RES. CARBON	6.8K	5%	1/6W
R321	RD14BB2C183J	RES. CARBON	18K	5%	1/6W
R322	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R323	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R324	RD14BB2C242J	RES. CARBON	2.4K	5%	1/6W
R325	RD14BB2C912J	RES. CARBON	9.1K	5%	1/6W
R326	RD14BB2C301J	RES. CARBON	300	5%	1/6W
R327	RD14BB2C391J	RES. CARBON	390	5%	1/6W
R328	RD14BB2C391J	RES. CARBON	390	5%	1/6W
R329	RD14BB2C390J	RES. CARBON	39	5%	1/6W
R330	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R331	RD14BB2C271J	RES. CARBON	270	5%	1/6W
R332	RD14BB2C132J	RES. CARBON	1.3K	5%	1/6W
R333	RD14BB2C432J	RES. CARBON	4.3K	5%	1/6W
R334	RD14BB2C432J	RES. CARBON	4.3K	5%	1/6W
R335	RD14BB2C243J	RES. CARBON	24K	5%	1/6W
R336	RD14BB2C243J	RES. CARBON	24K	5%	1/6W
R349	R92-1552-05	RES. LINEAR PCT	180		
R355	RD14BB2C391J	RES. CARBON	390	5%	1/6W
R362	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R363	RD14BB2C122J	RES. CARBON	1.2K	5%	1/6W
R364	RN14BK2C3901F	RES. METAL FILM	3.9K	1%	1/6W
R365	RN14BK2C6201F	RES. METAL FILM	6.2K	1%	1/6W
R366	R92-1560-05	RES. LINEAR PCT	2K		
R367	RD14BB2C393J	RES. CARBON	39K	5%	1/6W
R368	RD14BB2C622J	RES. CARBON	6.2K	5%	1/6W
R369	RD14BB2C204J	RES. CARBON	200K	5%	1/6W

PARTS LIST

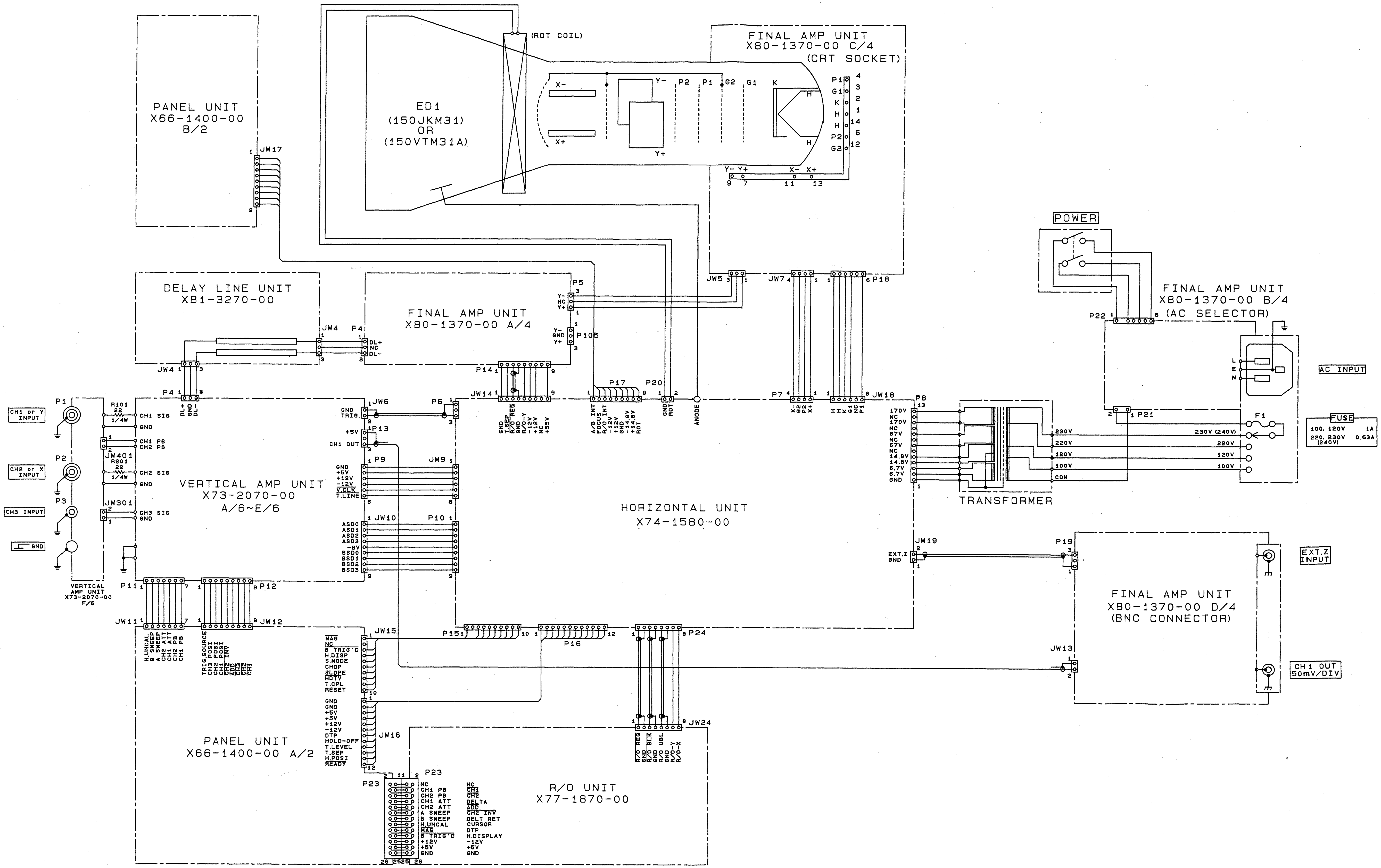
REF.NO	PARTS NO	NAME & DESCRIPTION
370	RD14BB2C302J	RES. CARBON 3K 5% 1/6W
R371	RD14BB2C222J	RES. CARBON 2.2K 5% 1/6W
R372	RD14BB2C222J	RES. CARBON 2.2K 5% 1/6W
R373	RD14BB2C152J	RES. CARBON 1.5K 5% 1/6W
R374	RD14BB2C152J	RES. CARBON 1.5K 5% 1/6W
R375	RD14BB2C362J	RES. CARBON 3.6K 5% 1/6W
R376	RD14BB2C362J	RES. CARBON 3.6K 5% 1/6W
R377	R92-1558-05	RES. SPECIAL POWER 39K 5% 1W
R378	R92-1558-05	RES. SPECIAL POWER 39K 5% 1W
R381	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R382	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R383	RD14BB2C751J	RES. CARBON 750 5% 1/6W
R384	RD14BB2C751J	RES. CARBON 750 5% 1/6W
R385	RN14BK2C6801F	RES. METAL FILM 6.8K 1% 1/6W
R386	RN14BK2C1303F	RES. METAL FILM 130K 1% 1/6W
R387	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R388	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R389	NO USE	
R390	RD14BB2C913J	RES. CARBON 91K 5% 1/6W
R394	R92-1559-05	RES. SPECIAL POWER 47K 5% 1W
R395	R92-1559-05	RES. SPECIAL POWER 47K 5% 1W
R396	RD14BB2C431J	RES. CARBON 430 5% 1/6W
R397	NO USE	
R398	RD14BB2C470J	RES. CARBON 47 5% 1/6W
R399	RD14BB2C470J	RES. CARBON 47 5% 1/6W
R400	NO USE	
R401	R92-1557-05	RES. SPECIAL POWER 6.8K 5% 2W
R402	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R403	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R404	R92-1556-05	RES. SPECIAL POWER 1K 5% 2W
R405	R92-1556-05	RES. SPECIAL POWER 1K 5% 2W
R406	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R407	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R408	NO USE	
R409	R92-1555-05	RES. SPECIAL POWER 56 5% 2W
R410	R92-1555-05	RES. SPECIAL POWER 56 5% 2W
R411	NO USE	
R412	R92-1555-05	RES. SPECIAL POWER 56 5% 2W
R413	R92-1555-05	RES. SPECIAL POWER 56 5% 2W
R414	R92-1554-05	RES. SPECIAL POWER 15 5% 2W
R415	RD14BB2C472J	RES. CARBON 4.7K 5% 1/6W
R416	RD14BB2C302J	RES. CARBON 3K 5% 1/6W
R417	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
TC101	C05-0470-05	CAP. TRIMMER 20P
TC102	C05-0470-05	CAP. TRIMMER 20P
TC303	C05-0490-05	CAP. TRIMMER 20P
TH301	112-103-2FM	THERMISTOR
U1	TC4053BP	IC,TRIPLE 2-CH MPX/DE-MPX
U2	NJM072BD	IC,JFET INPUT OP AMP
U3	MC10102L	IC,QUAD 2-INPUT NOR GATE
U4	KMS01	IC,LINEAR
U101	MC10131L	IC,DUAL D-FLIP FLOP
U102	KMD05	IC,LINEAR
U103	SN74ALS74AN	IC,DUAL D-F.F. (WITH PR&CLR)
U104	KMS01	IC,LINEAR
U105	KMD05	IC,LINEAR
U106	SN74ALS02N	IC,QUAD 2 INPUT NOR
U107	KMS01	IC,LINEAR
U108	SN74ALS74AN	IC,DUAL D-F.F. (WITH PR&CLR)
U109	TC74HC4053AP	IC,TRIPLE 2-CH ANALOG MPX
U201	NJM4558D	IC,DUAL OP-AMP
U301	TC74HC4053AP	IC,TRIPLE 2-CH ANALOG MPX
U401	KMA02	IC,LINEAR
VR1	R12-0680-05	RES. SEMI FIXED 47K
VR2	R12-0680-05	RES. SEMI FIXED 47K
VR102	R12-0694-05	RES. SEMI FIXED 4.7KB
VR103	R12-0680-05	RES. SEMI FIXED 47K
VR104	R12-1860-05	RES. SEMI FIXED 1KB
VR201	R12-5545-05	RES. SEMI FIXED 2.2MB
VR202	R12-6507-05	RES. SEMI FIXED 470K
VR301	R12-0680-05	RES. SEMI FIXED 47K
VR302	R12-0882-05	RES. SEMI FIXED 100 B
VR303	R12-0678-05	RES. SEMI FIXED 10KB
VR304	R12-0694-05	RES. SEMI FIXED 4.7KB
VR305	R12-6501-05	RES. SEMI FIXED 470KB
VR306	NO USE	
VR307	R12-0680-05	RES. SEMI FIXED 47K
VR308	R12-0890-05	RES. SEMI FIXED 470 B
VR309	R12-0883-05	RES. SEMI FIXED 220 B
W201	W02-2256-05	HIGH VOLTAGE BLOCK

CS-5230 R/O UNIT

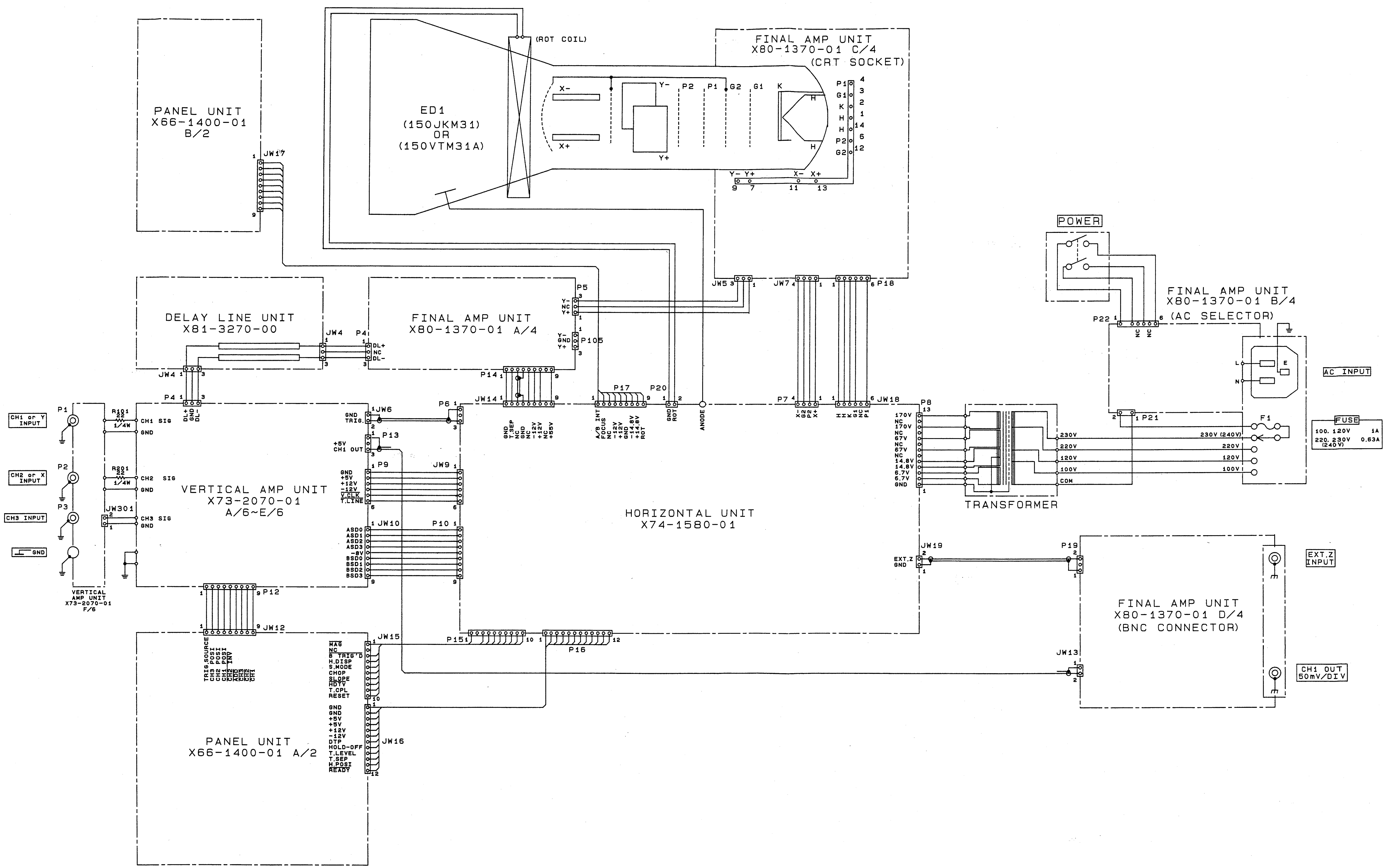
X77-1870-00

REF.NO	PARTS NO	NAME & DESCRIPTION
	J73-0282-02	PCB (UNMOUNTED)
C1	C91-2538-05	CAP. MYLAR 0.1 63V
C2	C91-2538-05	CAP. MYLAR 0.1 63V
C3	C91-1128-05	CAP. CERAMIC 0.1 80/-20% 50V
C4	C91-2538-05	CAP. MYLAR 0.1 63V
C5	C91-1128-05	CAP. CERAMIC 0.1 80/-20% 50V
C6	C91-2538-05	CAP. MYLAR 0.1 63V
C7	C91-2538-05	CAP. MYLAR 0.1 63V
C8	C91-2538-05	CAP. MYLAR 0.1 63V
C9	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C10	C91-2538-05	CAP. MYLAR 0.1 63V
C11	C91-2538-05	CAP. MYLAR 0.1 63V
C12	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C13	C91-1128-05	CAP. CERAMIC 0.1 80/-20% 50V
C14	C91-1128-05	CAP. CERAMIC 0.1 80/-20% 50V
C15	C91-1128-05	CAP. CERAMIC 0.1 80/-20% 50V
C16	C91-1128-05	CAP. CERAMIC 0.1 80/-20% 50V
C17	C91-1128-05	CAP. CERAMIC 0.1 80/-20% 50V
C18	C91-0755-05	CAP. CERAMIC 680P 10% 50V
C19	C91-0755-05	CAP. CERAMIC 680P 10% 50V
C20	C91-1128-05	CAP. CERAMIC 0.1 80/-20% 50V
C21	C91-1128-05	CAP. CERAMIC 0.1 80/-20% 50V
C22	C91-1128-05	CAP. CERAMIC 0.1 80/-20% 50V
C23	CC45FCH1H270J	CAP. CERAMIC 27P 5% 50V
C24	CC45FCH1H270J	CAP. CERAMIC 27P 5% 50V
C25	C91-1128-05	CAP. CERAMIC 0.1 80/-20% 50V
C26	C91-1128-05	CAP. CERAMIC 0.1 80/-20% 50V
C29	CC45FCH1H101J	CAP. CERAMIC 100P 5% 50V
C30	C91-2538-05	CAP. MYLAR 0.1 63V
C31	C91-2538-05	CAP. MYLAR 0.1 63V
C32	C91-2538-05	CAP. MYLAR 0.1 63V
C33	C90-3226-05	CAP. ELECTRO 22 20% 16V
C34	C91-2538-05	CAP. MYLAR 0.1 63V
C35	C91-2538-05	CAP. MYLAR 0.1 63V
C36	C91-1128-05	CAP. CERAMIC 0.1 80/-20% 50V
C39	C91-2538-05	CAP. MYLAR 0.1 63V
C40	C91-2538-05	CAP. MYLAR 0.1 63V
C41	C91-2538-05	CAP. MYLAR 0.1 63V
C42	C91-2538-05	CAP. MYLAR 0.1 63V
C43	C91-1128-05	CAP. CERAMIC 0.1 80/-20% 50V
C44	C91-1128-05	CAP. CERAMIC 0.1 80/-20% 50V
C45	C91-2538-05	CAP. MYLAR 0.1 63V
C46	C91-2538-05	CAP. MYLAR 0.1 63V
C47	C91-2538-05	CAP. MYLAR 0.1 63V
C48	C91-1128-05	CAP. CERAMIC 0.1 80/-20% 50V
C49	C91-1128-05	CAP. CERAMIC 0.1 80/-20% 50V
C50	C91-1128-05	CAP. CERAMIC 0.1 80/-20% 50V
C51	C90-3230-05	CAP. ELECTRO 100 20% 16V
C52	C90-3230-05	CAP. ELECTRO 100 20% 16V
C53	C90-3230-05	CAP. ELECTRO 100 20% 16V
C54	C90-3230-05	CAP. ELECTRO 100 20% 16V
C55	C90-3216-05	CAP. ELECTRO 330 20% 6.3V
C56	NO USE	
C57	CC45FCH1H680J	CAP. CERAMIC 68P 5% 50V
C58	CC45FCH1H680J	CAP. CERAMIC 68P 5% 50V
C59	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C60	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
JW24	E38-0982-05	WIRE ASS'Y:8P
JW25	E38-1000-15	WIRE ASS'Y:1P, EARTH LUG
L1	L79-0551-05	NOISE FILTER
L2	L79-0551-05	NOISE FILTER
L3	L79-0551-05	NOISE FILTER
L4	L79-0551-05	NOISE FILTER
L5	R92-1061-05	JUMPING RES. ZERO OHM(5MM)
P23	E40-7404-05	PIN CONNECTOR 26P
R1	RN14BK2C9100F	RES. METAL FILM 910 1% 1/6W
R4	RN14BK2C1101F	RES. METAL FILM 1.1K 1% 1/6W
R7	RN14BK2C3301F	RES. METAL FILM 3.3K 1% 1/6W
R8	RN14BK2C3301F	RES. METAL FILM 3.3K 1% 1/6W
R9	RN14BK2C3001F	RES. METAL FILM 3K 1% 1/6W
R10	RN14BK2C1301F	RES. METAL FILM 1.3K 1% 1/6W
R11	RN14BK2C2701F	RES. METAL FILM 2.7K 1% 1/6W
R12	RN14BK2C2701F	RES. METAL FILM 2.7K 1% 1/6W
R13	RN14BK2C3301F	RES. METAL FILM 3.3K 1% 1/6W
R14	RN14BK2C1601F	RES. METAL FILM 1.6K 1% 1/6W
R15	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R16	RD14BB2C472J	RES. CARBON 4.7K 5% 1/6W
R17	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R18	RD14BB2C152J	RES. CARBON 1.5K 5% 1/6W

CS-5230 SCHEMATIC DIAGRAM

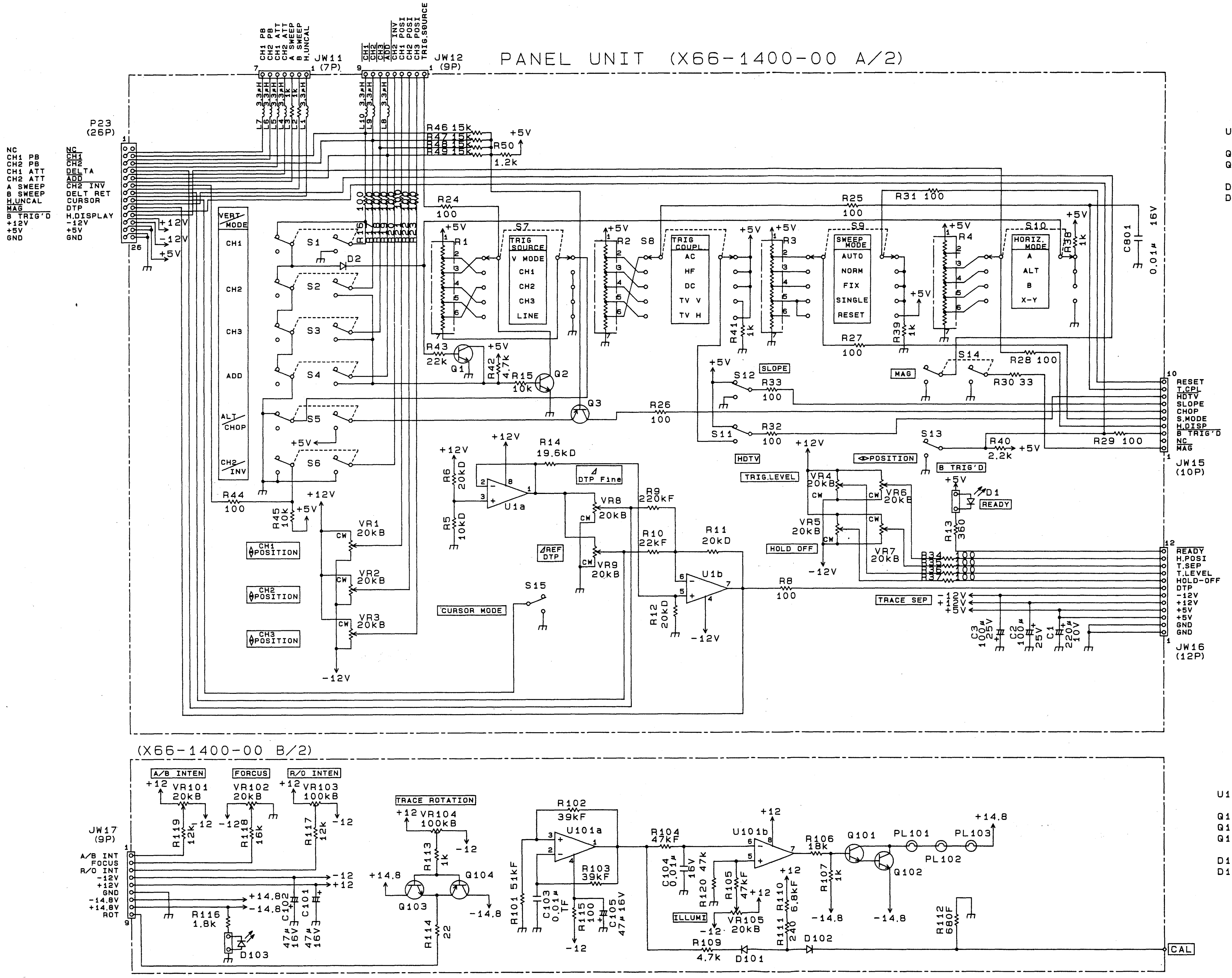

PANEL UNIT
X66-1400-00
B/2
JW17
ED1
(150JKM31)
OR
(150VTM31A)
(ROT COIL)
FINAL AMP UNIT
X80-1370-00 C/4
(CRT SOCKET)
X-
X+
Y-
Y+
P2
P1
G2
G1
K
H
P1
G1
K
H
H
P2
G2
Y- Y+
X- X+
POWER
FINAL AMP UNIT
X80-1370-00 B/4
(AC SELECTOR)
P22
P21
AC INPUT
L
E
N
F1
FUSE
100, 120V 1A
220, 230V (240V) 0.63A
230V (240V)
220V
120V
100V
230V
220V
120V
100V
COM
TRANSFORMER
DELAY LINE UNIT
X81-3270-00
JW4
P4
DL+
NC
DL-
FINAL AMP UNIT
X80-1370-00 A/4
P5
Y-
NC
Y+
P105
Y-
GND
Y+
P14
JW14
JW5
JW7
P18
P7
JW18
P17
P20
GND
ROT
ANODE
A/B INT
FOCUS
R/O INT
-12V
+12V
GND
-14.8V
+14.8V
ROT
X-
X2
Y2
X+
H
H
K
G1
NC
P1
P8
170V
NC
170V
NC
67V
NC
67V
NC
14.8V
14.8V
6.7V
6.7V
GND
CH1 or Y INPUT
CH2 or X INPUT
CH3 INPUT
GND
P1
P2
P3
R101
22
1/4W
R201
22
1/4W
JW401
JW301
CH1 SIG
GND
CH1 PB
CH2 PB
CH2 SIG
GND
CH3 SIG
GND
VERTICAL AMP UNIT
X73-2070-00
A/6~E/6
VERTICAL AMP UNIT
X73-2070-00
F/6
GND
TRIG.
JW6
P6
+5V
P13
CH1 OUT
P9
JW9
GND
+5V
+12V
-12V
V.CLK
T.LINE
JW10
P10
ASD0
ASD1
ASD2
ASD3
-8V
BSD0
BSD1
BSD2
BSD3
GND
T.SEP
R/O REG
GND
R/O-Y
-12V
+12V
NC
+5V
HORIZONTAL UNIT
X74-1580-00
JW19
EXT.Z
GND
P19
FINAL AMP UNIT
X80-1370-00 D/4
(BNC CONNECTOR)
EXT.Z INPUT
JW13
CH1 OUT
50mV/DIV
P11
P12
JW11
JW12
H.UNCAL
B SWEEP
A SWEEP
CH2 ATT
CH1 ATT
CH2 PB
CH1 PB
TRIG SOURCE
CH3 POSI
CH2 POSI
CH1 POSI
CH2 INV
ADD
CH3
CH2
CH1
JW15
MAG
NC
B TRIG'D
H.DISP
S.MODE
CHOP
SLOPE
HDTV
T.CPL
RESET
P15
P16
P24
GND
GND
+5V
+5V
+12V
-12V
DTP
HOLD-OFF
T.LEVEL
T.SEP
H.POSI
READY
JW16
JW24
R/O REG
GND
R/O BLK
GND
R/O UBL
GND
R/O-Y
R/O-X
PANEL UNIT
X66-1400-00 A/2
P23
NC
CH1 PB
CH2 PB
CH1 ATT
CH2 ATT
A SWEEP
B SWEEP
H.UNCAL
MAG
B TRIG'D
+12V
+5V
GND
NC
CH1
CH2
DELTA
ADD
CH2 INV
DELT RET
CURSOR
DTP
H.DISPLAY
-12V
+5V
GND
R/O UNIT
X77-1870-00

CS-5235 SCHEMATIC DIAGRAM


PANEL UNIT
X66-1400-01
B/2
JW17
1
9
ED1
(150JKM31)
OR
(150VTM31A)
(ROT COIL)
X-
X+
Y-
Y+
P2
P1
G2
G1
K
H
H
FINAL AMP UNIT
X80-1370-01 C/4
(CRT SOCKET)
P1
G1
K
H
H
P2
G2
4
3
2
1
14
6
12
Y-
Y+
X-
X+
9
7
11
13
JW5
3
1
JW7
4
1
1
6
P18
DELAY LINE UNIT
X81-3270-00
JW4
1
3
P4
DL+
NC
DL-
FINAL AMP UNIT
X80-1370-01 A/4
P5
Y-
NC
Y+
P105
Y-
GND
Y+
P14
JW14
GND
T.SEP
NC
GND
NC
-12V
+12V
NC
+55V
P17
A/B INT
FOCUS
NC
-12V
+12V
GND
-14.8V
+14.8V
ROT
P20
GND
ROT
ANODE
P7
X-
G2
P2
X+
JW18
H
H
K
G1
NC
P1
P8
13
170V
NC
170V
NC
67V
NC
67V
NC
14.8V
14.8V
6.7V
6.7V
GND
TRANSFORMER
230V
220V
120V
100V
COM
POWER
FINAL AMP UNIT
X80-1370-01 B/4
(AC SELECTOR)
P22
NC
NC
L
N
E
AC INPUT
P21
F1
230V (240V)
220V
120V
100V
FUSE
100. 120V 1A
220. 230V (240V) 0.63A
CH1 or Y INPUT
CH2 or X INPUT
CH3 INPUT
GND
P1
P2
P3
R101
22
1/4W
R201
22
1/4W
JW301
CH1 SIG
GND
CH2 SIG
GND
CH3 SIG
GND
VERTICAL AMP UNIT
X73-2070-01
F/6
DL+
GND
DL-
VERTICAL AMP UNIT
X73-2070-01
A/6~E/6
GND
TRIG.
JW6
P6
P13
+5V
CH1 OUT
P9
JW9
GND
+5V
+12V
-12V
V.CLK
T.LINE
JW10
P10
ASD0
ASD1
ASD2
ASD3
-8V
BSD0
BSD1
BSD2
BSD3
P12
JW12
TRIG.SOURCE
CH3 POSI
CH2 POSI
CH1 POSI
CH2 INV
ADD
CH3
CH2
CH1
HORIZONTAL UNIT
X74-1580-01
JW19
EXT.Z
GND
P19
EXT.Z INPUT
FINAL AMP UNIT
X80-1370-01 D/4
(BNC CONNECTOR)
JW13
CH1 OUT
50mV/DIV
P15
P16
JW15
MAG
NC
B TRIG'D
H.DISP
S.MODE
CHOP
SLOPE
HDTV
T.CPL
RESET
JW16
GND
GND
+5V
+5V
+12V
-12V
DTP
HOLD-OFF
T.LEVEL
T.SEP
H.POSI
READY
PANEL UNIT
X66-1400-01 A/2

CS-5230 SCHEMATIC DIAGRAM

PANEL UNIT (X66-1400-00)


PANEL UNIT (X66-1400-00 A/2)
(X66-1400-00 B/2)
P23
(26P)
NC
CH1 PB
CH2 PB
CH1 ATT
CH2 ATT
A SWEEP
B SWEEP
H.UNCAL
MAG
B TRIG'D
+12V
+5V
GND
NC
CH1
CH2
DELTA
ADD
CH2 INV
DELT RET
CURSOR
DTP
H.DISPLAY
-12V
+5V
GND
JW11
(7P)
JW12
(9P)
CH1 POSI
CH2 POSI
CH3 POSI
TRIG.SOURCE
L1 3.3µH
L2 1k
L3 1k
L4 3.3µH
L5 3.3µH
L6 3.3µH
L7 3.3µH
L8 3.3µH
L9 3.3µH
L10 3.3µH
R46 15k
R47 15k
R48 15k
R49 15k
R50 1.2k
R24 100
R25 100
R31 100
VERT MODE
CH1
CH2
CH3
ADD
ALT
CHOP
CH2 INV
S1
S2
S3
S4
S5
S6
D2
R1
S7
TRIG SOURCE
V MODE
LINE
R2
S8
TRIG COUPL
AC
HF
DC
TV V
TV H
R3
S9
SWEEP MODE
AUTO
NORM
FIX
SINGLE
RESET
R4
S10
HORIZ. MODE
A
ALT
B
X-Y
R38 1k
C801 0.01µ 16V
R41 1k
R39 1k
R27 100
R43 22k
Q1
R42 4.7k
R15 10k
Q2
Q3
R26 100
S12
SLOPE
R33 100
S11
R32 100
HDTV
S13
S14
MAG
R28 100
R30 33
R40 2.2k
R29 100
B TRIG'D
D1
READY
R13 360
JW15
(10P)
RESET
T.CPL
HDTV
SLOPE
CHOP
S.MODE
H.DISP
B TRIG'D
NC
MAG
R44 100
R45 10k
VR1 20kB
VR2 20kB
VR3 20kB
CH1 POSITION
CH2 POSITION
CH3 POSITION
R14 19.6kD
R6 20kD
R5 10kD
U1a
DTP Fine
VR8 20kB
R9 220kF
REF DTP
VR9 20kB
R10 22kF
R11 20kD
U1b
R12 20kD
R8 100
S15
CURSOR MODE
TRIG.LEVEL
POSITION
VR4 20kB
VR5 20kB
VR6 20kB
VR7 20kB
HOLD OFF
TRACE SEP
R34 100
R35 100
R36 100
R37 100
C3 100µ 25V
C2 100µ 25V
C1 220µ 10V
JW16
(12P)
READY
H.POSI
T.SEP
T.LEVEL
HOLD-OFF
DTP
-12V
+12V
+5V
+5V
GND
GND
A/B INTEN
FORCUS
R/O INTEN
VR101 20kB
VR102 20kB
VR103 100kB
R119 12k
R118 16k
R117 12k
JW17
(9P)
A/B INT
FOCUS
R/O INT
-12V
+12V
GND
-14.8V
+14.8V
ROT
R116 1.8k
D103
C102 47µ 16V
C101 47µ 16V
TRACE ROTATION
VR104 100kB
R113 1k
Q103
Q104
R114 22
R102 39kF
U101a
R103 39kF
R101 51kF
C103 0.01µ TF
R115 100
C105 47µ 16V
R104 47kF
C104 0.01µ 16V
R120 47k
R105 47kF
U101b
R110 6.8kF
R111 240
ILLUMI
VR105 20kB
R106 18k
R107 1k
Q101
Q102
PL101
PL102
PL103
R112 68F
R109 4.7k
D101
D102
CAL

U1 :NJM4558L

Q1, 2 :2SC1740S (R, S)
Q3 :2SA933S (R, S)

D1 :LN322GP
D2 :1SS132

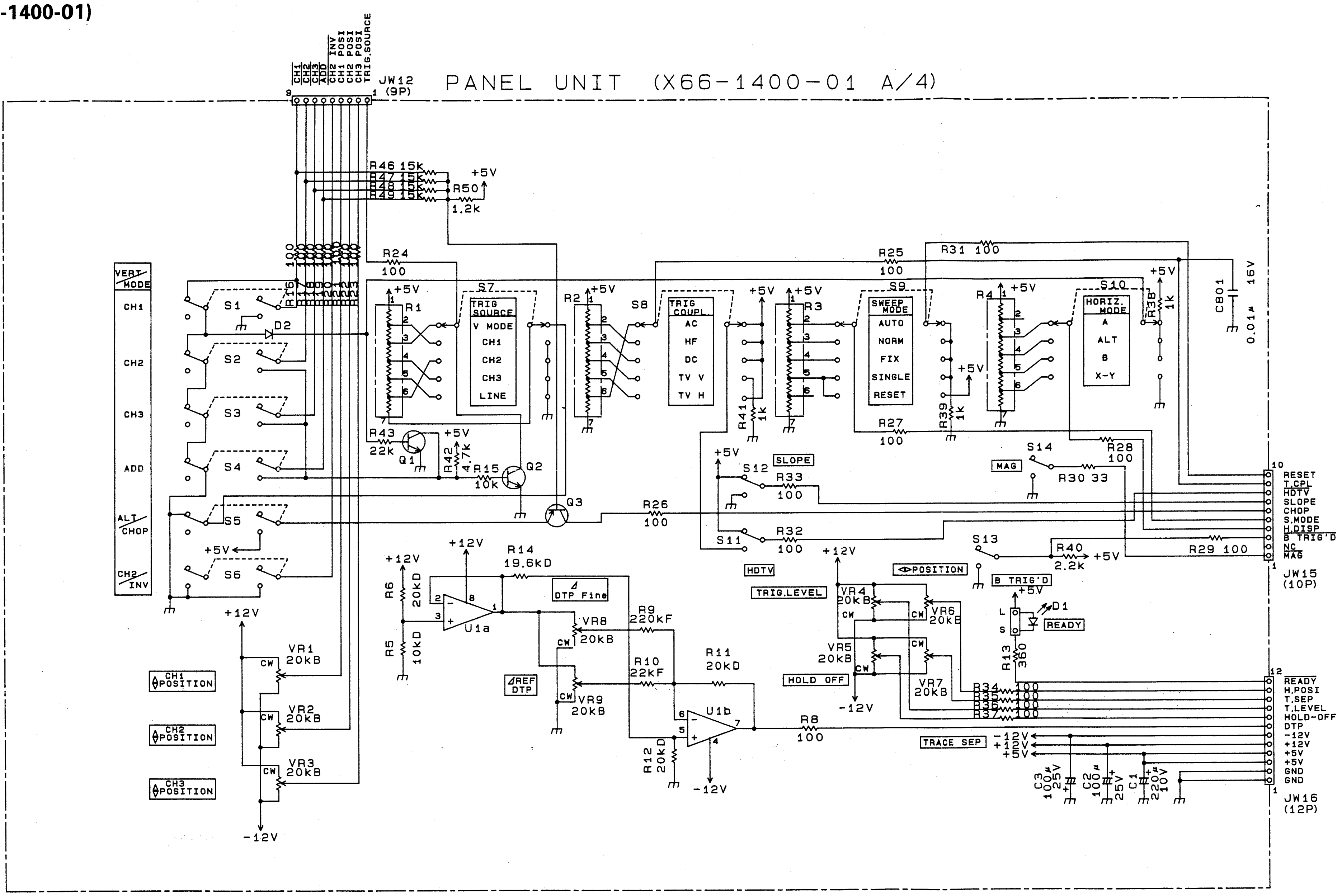
U101 :NJM4558L

Q101, 102 :2SC1740 (R, S)
Q103 :2SC1318A (R)
Q104 :2SA720A (R)

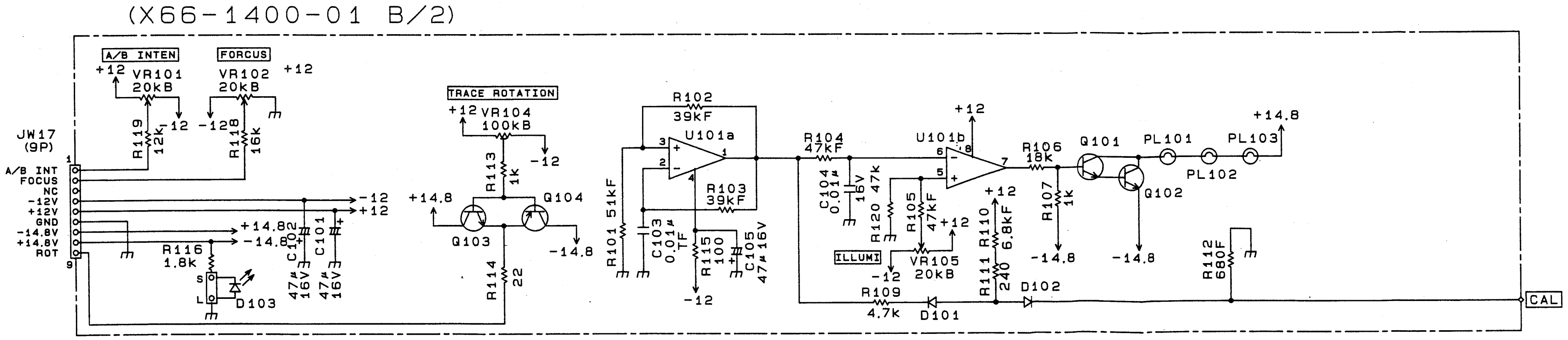
D101, 102 :1SS132
D103 :LN322GP

CS-5235 SCHEMATIC DIAGRAM

PANEL UNIT (X66-1400-01)


PANEL UNIT (X66-1400-01 A/4)
JW12 (9P)
CH1 CH2 CH3 ADD INV CH1 POSI CH2 POSI CH3 POSI TRIG.SOURCE
R46 15k
R47 15k
R48 15k
R49 15k
R50 1.2k
+5V
R24 100
VERT MODE
CH1
CH2
CH3
ADD
ALT CHOP
CH2 INV
S1
S2
S3
S4
S5
S6
D2
S7
TRIG SOURCE
V MODE
LINE
R1
R43 22k
Q1
R42 4.7k
R15 10k
Q2
Q3
R2
S8
TRIG COUPL
AC
HF
DC
TV V
TV H
R41 1k
R3
S9
SWEEP MODE
AUTO
NORM
FIX
SINGLE
RESET
R39 1k
R27 100
R25 100
R31 100
R4
S10
HORIZ. MODE
A
ALT
B
X-Y
R38 1k
C801 0.01μ 16V
R26 100
S12
SLOPE
R33 100
S11
R32 100
HDTV
S14
MAG
R28 100
R30 33
S13
R40 2.2k
R29 100
B TRIG'D
JW15 (10P)
RESET
T.CPL
HDTV
SLOPE
CHOP
S.MODE
H.DISP
B TRIG'D
NC
MAG
+12V
-12V
R14 19.6kD
R6 20kD
R5 10kD
U1a
DTP Fine
R9 220kF
VR8 20kB
REF DTP
VR9 20kB
R10 22kF
R11 20kD
U1b
R12 20kD
R8 100
CH1 POSITION
CH2 POSITION
CH3 POSITION
VR1 20kB
VR2 20kB
VR3 20kB
CW
TRIG.LEVEL
VR4 20kB
POSITION
VR6 20kB
VR5 20kB
VR7 20kB
HOLD OFF
D1
READY
R13 360
R34 100
R35 100
R36 100
R37 100
TRACE SEP
C3 100μ 25V
C2 100μ 25V
C1 220μ 10V
JW16 (12P)
READY
H.POSI
T.SEP
T.LEVEL
HOLD-OFF
DTP
-12V
+12V
+5V
+5V
GND
GND

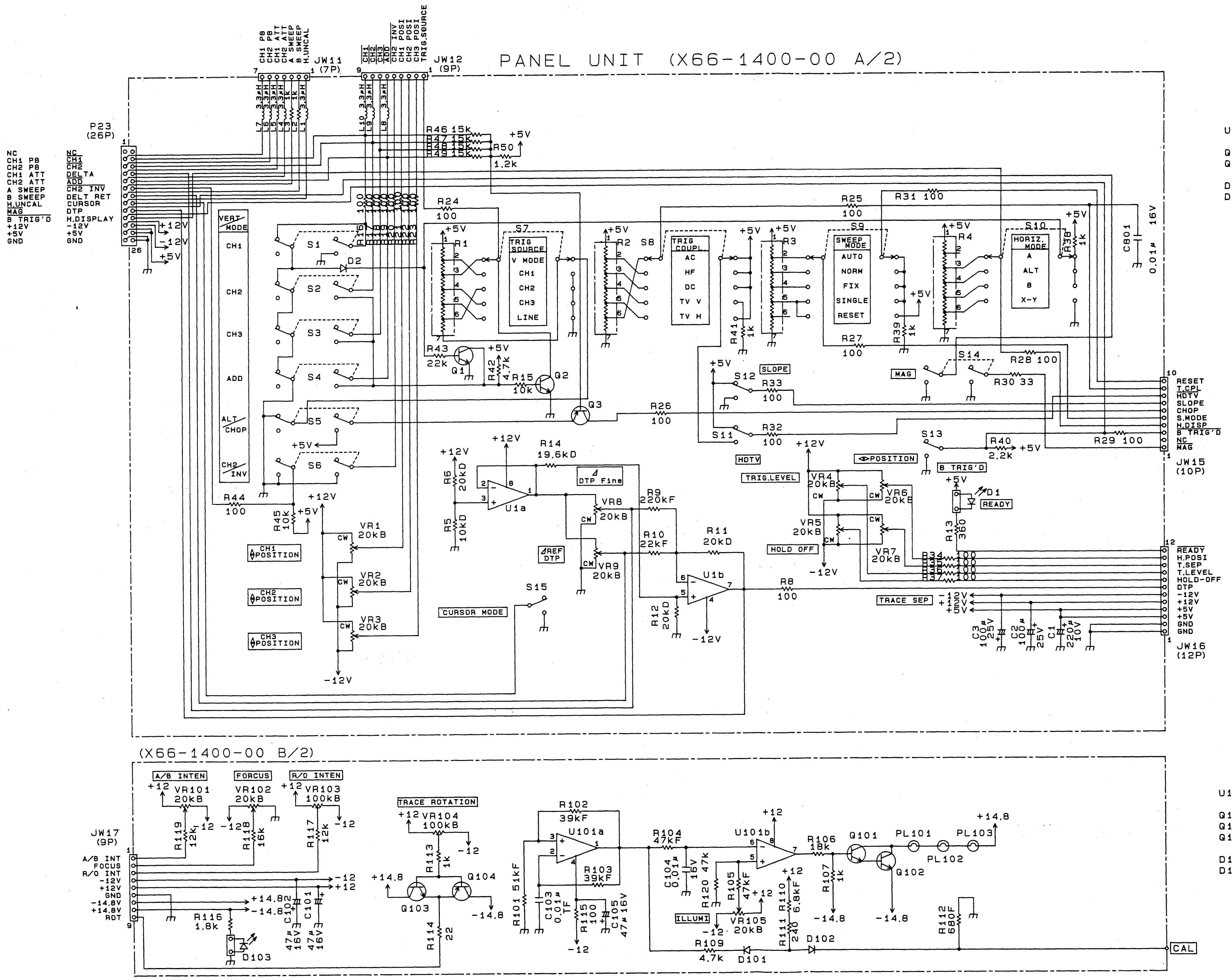
Q1	2SC1740S (R, S)
Q2	2SC1740S (R, S)
Q3	2SA933S (R, S)
U1	NJM4558L
D1	LN322GP
D2	1SS132


(X66-1400-01 B/2)
A/B INTEN
VR101 20kB
FORCUS
VR102 20kB
R119 12k
R118 16k
JW17 (9P)
A/B INT
FOCUS
NC
-12V
+12V
GND
-14.8V
+14.8V
ROT
R116 1.8k
D103
C102 47μ 16V
C101 47μ 16V
TRACE ROTATION
VR104 100kB
R113 1k
Q103
Q104
R114 22
+14.8
-14.8
R102 39kF
U101a
R103 39kF
R101 51kF
C103 0.01μ TF
R115 100
C105 47μ 16V
R104 47kF
C104 0.01μ 16V
R120 47k
R105 47kF
ILLUMI
VR105 20kB
R109 4.7k
D101
U101b
R110 6.8kF
R111 240
D102
R106 18k
R107 1k
Q101
Q102
PL101
PL102
PL103
R112 680F
CAL

U101	NJM4558L
Q101	2SC1740S (R, S)
Q102	2SC1740S (R, S)
Q103	2SC1318A (R)
Q104	2SA720A (R)
D101	1SS132
D102	1SS132
D103	LN322GP

CS-5230 SCHEMATIC DIAGRAM

PANEL UNIT (X66-1400-00)


PANEL UNIT (X66-1400-00 A/2)
(X66-1400-00 B/2)
P23 (26P)
NC
CH1 PB
CH2 PB
CH1 ATT
CH2 ATT
A SWEEP
B SWEEP
H.UNCAL
MAG
B TRIG'D
+12V
+5V
GND
CH1
CH2
DELTA
ADD
CH2 INV
DELT RET
CURSOR
DTP
H.DISPLAY
-12V
JW11 (7P)
JW12 (9P)
CH3 POSI
TRIG.SOURCE
VERT MODE
ALT/CHOP
CH2/INV
S1
S2
S3
S4
S5
S6
D2
TRIG SOURCE
V MODE
LINE
S7
S8
TRIG COUPL.
AC
HF
DC
TV V
TV H
S9
SWEEP MODE
AUTO
NORM
FIX
SINGLE
RESET
S10
HORIZ. MODE
A
ALT
B
X-Y
C801 0.01μ 16V
R46 15k
R50 1.2k
R24 100
R25 100
R31 100
R43 22k
Q1
Q2
Q3
R15 10k
R26 100
R27 100
R28 100
R30 33
R29 100
R40 2.2k
SLOPE
MAG
S11
S12
S13
S14
R32 100
R33 100
HDTV
TRIG.LEVEL
POSITION
B TRIG'D
READY
D1
R13 360
VR4 20kB
VR5 20kB
VR6 20kB
VR7 20kB
HOLD OFF
TRACE SEP
R14 19.6kD
DTP Fine
U1a
U1b
VR8 20kB
VR9 20kB
REF DTP
R9 220kF
R10 22kF
R11 20kD
R8 100
R12 20kD
S15
CURSOR MODE
CH1 POSITION
CH2 POSITION
CH3 POSITION
VR1 20kB
VR2 20kB
VR3 20kB
R44 100
R45 10k
R5 10kD
R6 20kD
JW15 (10P)
RESET
T.CPL
HDTV
SLOPE
CHOP
S.MODE
H.DISP
B TRIG'D
NC
MAG
JW16 (12P)
READY
H.POSI
T.SEP
T.LEVEL
HOLD-OFF
DTP
-12V
+12V
+5V
+5V
GND
GND
C3 100μ 25V
C2 100μ 25V
C1 220μ 10V
A/B INTEN
FORCUS
R/O INTEN
VR101 20kB
VR102 20kB
VR103 100kB
R119 12k
R118 16k
R117 12k
JW17 (9P)
A/B INT
FOCUS
R/O INT
-12V
+12V
GND
-14.8V
+14.8V
ROT
R116 1.8k
D103
C102 47μ 16V
C101 47μ 16V
TRACE ROTATION
VR104 100kB
R113 1k
Q103
Q104
R114 22
R101 51kF
C103 0.01μ TF
R102 39kF
U101a
R103 39kF
R115 100
C105 47μ 16V
R104 47kF
C104 0.01μ 16V
R120 47k
R105 47kF
U101b
ILLUMI
VR105 20kB
R110 6.8kF
R111 240
R109 4.7k
D101
D102
R106 18k
R107 1k
Q101
Q102
PL101
PL102
PL103
+14.8
R112 680F
CAL

U1 :NJM4558L

Q1, 2 :2SC1740S (R, S)
Q3 :2SA933S (R, S)

D1 :LN322GP
D2 :1SS132

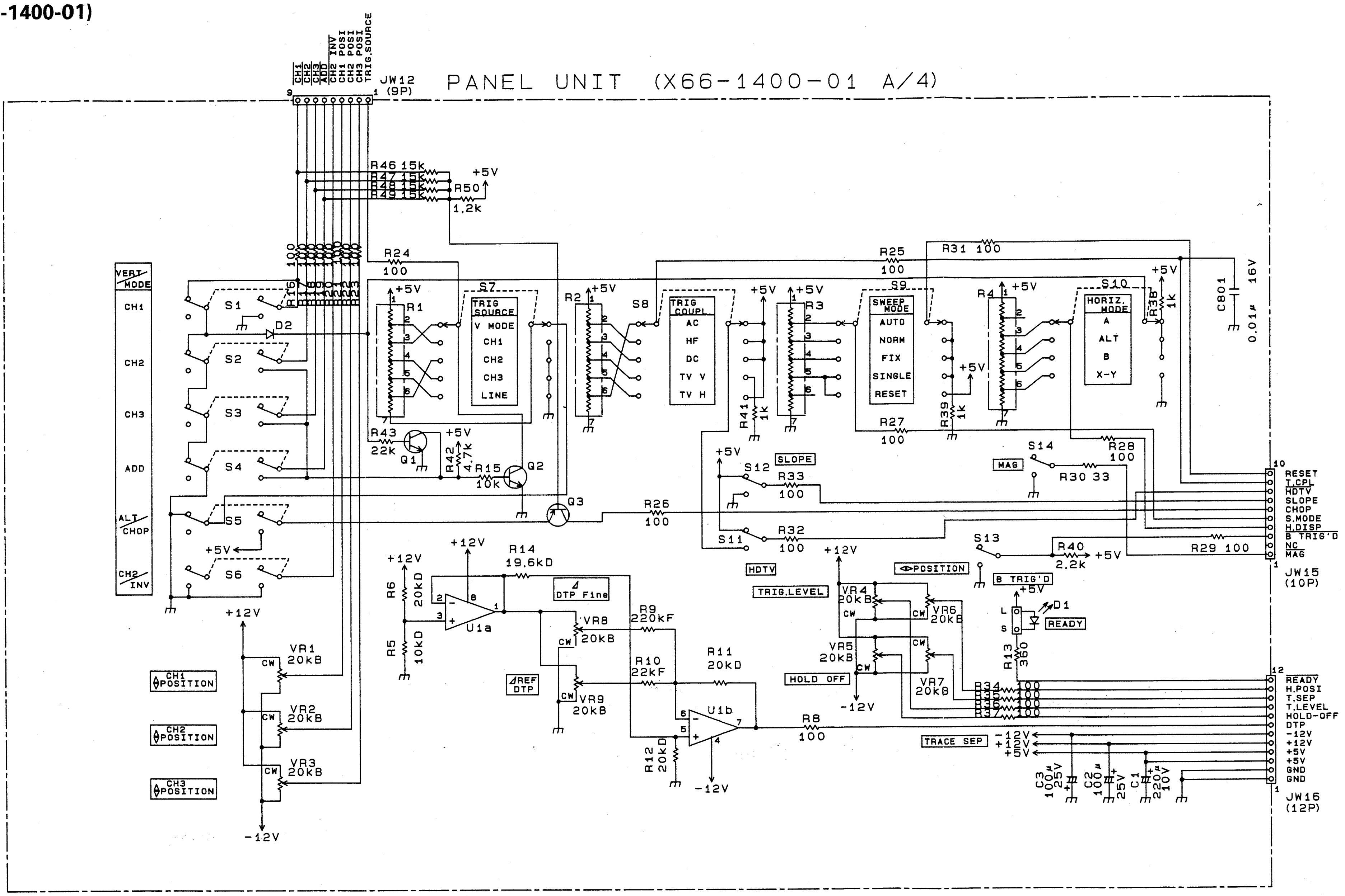
U101 :NJM4558L

Q101, 102 :2SC1740 (R, S)
Q103 :2SC1318A (R)
Q104 :2SA720A (R)

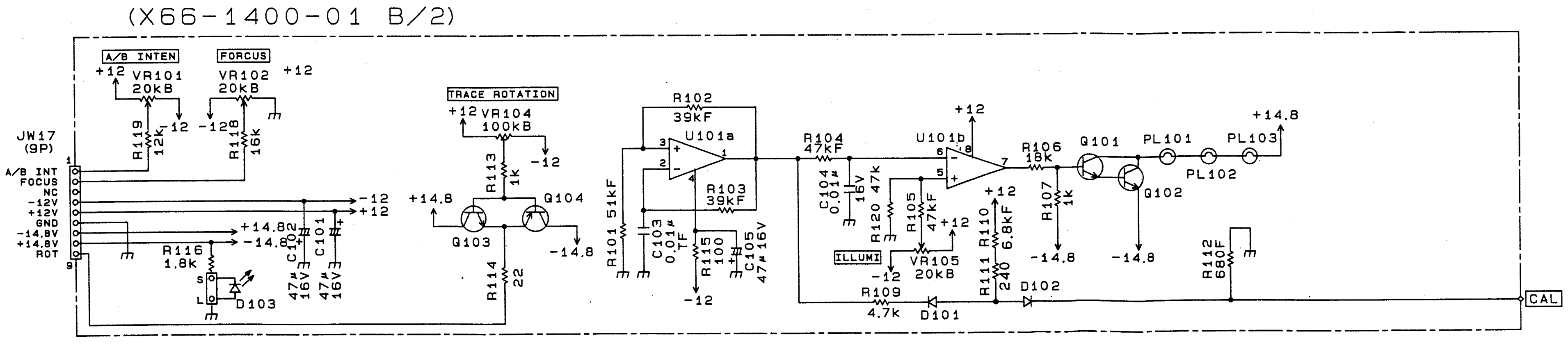
D101, 102 :1SS132
D103 :LN322GP

CS-5235 SCHEMATIC DIAGRAM

PANEL UNIT (X66-1400-01)


PANEL UNIT (X66-1400-01 A/4)
JW12 (9P)
CH1 INV
CH2 INV
CH3 INV
ADD
CH1 POSI
CH2 POSI
CH3 POSI
TRIG.SOURCE
R46 15k
R47 15k
R48 15k
R49 15k
R50 1.2k
+5V
R24 100
R25 100
R31 100
VERT MODE
CH1
CH2
CH3
ADD
ALT/CHOP
CH2 INV
S1
S2
S3
S4
S5
S6
D2
S7
TRIG SOURCE
V MODE
CH1
CH2
CH3
LINE
R1
R2
S8
TRIG COUPL
AC
HF
DC
TV V
TV H
R3
S9
SWEEP MODE
AUTO
NORM
FIX
SINGLE
RESET
R4
S10
HORIZ. MODE
A
ALT
B
X-Y
R38 1k
C801 0.01µ 16V
R41 1k
R39 1k
R27 100
R28 100
R43 22k
Q1
R42 4.7k
R15 10k
Q2
Q3
R26 100
S12
SLOPE
R33 100
S11
R32 100
S14
MAG
R30 33
S13
R40 2.2k
R29 100
HDTV
TRIG.LEVEL
POSITION
B TRIG'D
D1
READY
R13 360
VR4 20kB
VR5 20kB
VR6 20kB
VR7 20kB
HOLD OFF
R34
R35
R36
R37
100
TRACE SEP
R14 19.6kD
DTP Fine
R6 20kD
R5 10kD
U1a
VR8 20kB
R9 220kF
REF DTP
VR9 20kB
R10 22kF
R11 20kD
U1b
R8 100
R12 20kD
+12V
-12V
VR1 20kB
VR2 20kB
VR3 20kB
CH1 POSITION
CH2 POSITION
CH3 POSITION
CW
C3 100µ 25V
C2 100µ 25V
C1 220µ 10V
JW15 (10P)
RESET
T.CPL
HDTV
SLOPE
CHOP
S.MODE
H.DISP
B TRIG'D
NC
MAG
JW16 (12P)
READY
H.POSI
T.SEP
T.LEVEL
HOLD-OFF
DTP
-12V
+12V
+5V
+5V
GND
GND

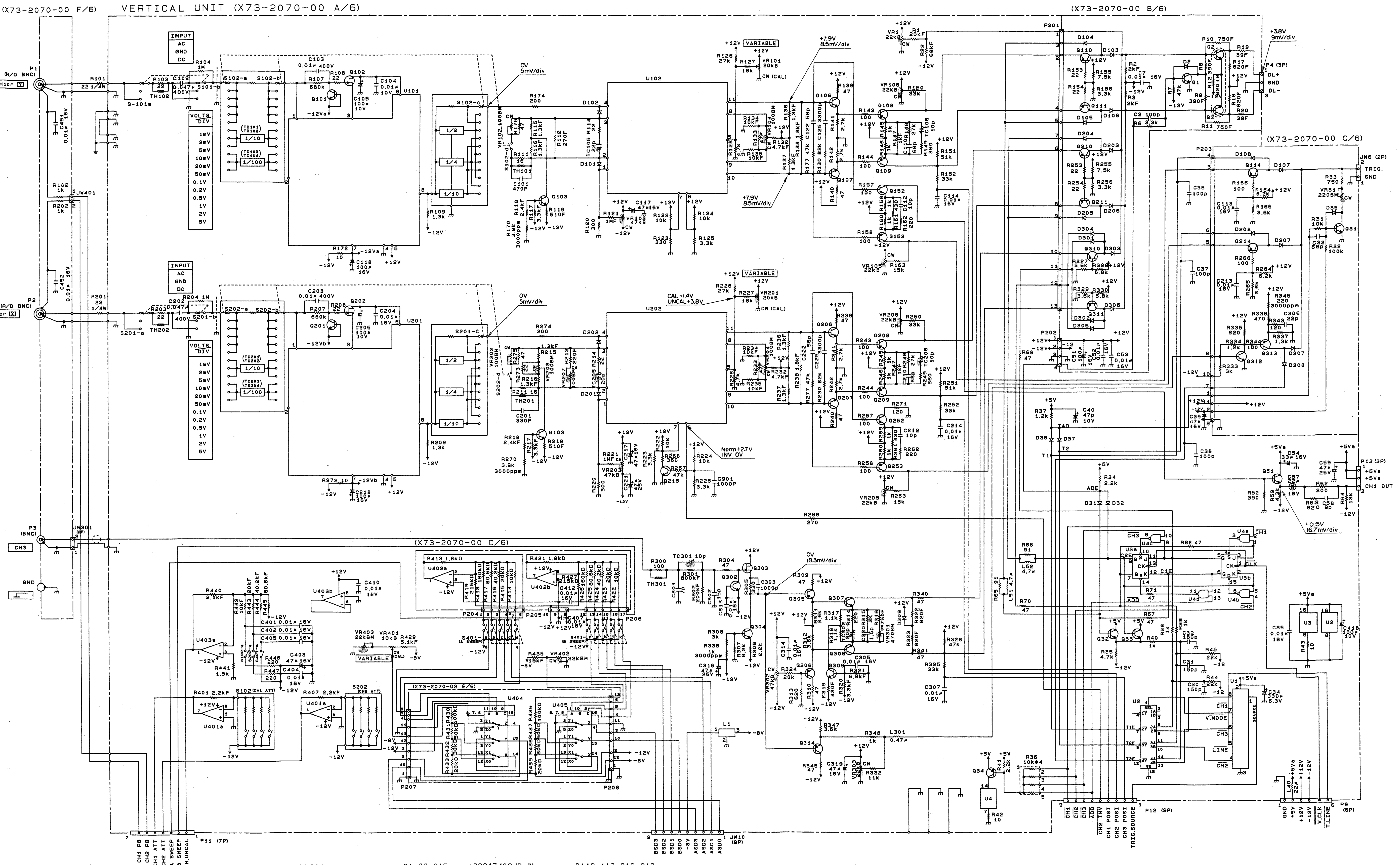
Q1	2SC1740S (R, S)
Q2	2SC1740S (R, S)
Q3	2SA933S (R, S)
U1	NJM4558L
D1	LN322GP
D2	1SS132


(X66-1400-01 B/2)
A/B INTEN
FORCUS
VR101 20kB
VR102 20kB
R119 12k
R118 16k
JW17 (9P)
A/B INT
FOCUS
NC
-12V
+12V
GND
-14.8V
+14.8V
ROT
R116 1.8k
D103
C102 47µ 16V
C101 47µ 16V
TRACE ROTATION
VR104 100kB
R113 1k
Q103
Q104
R114 22
R102 39kF
U101a
R103 39kF
R101 51kF
C103 0.01µ TF
R115 100
C105 47µ 16V
R104 47kF
C104 0.01µ 16V
R120 47k
R105 47kF
ILLUMI
VR105 20kB
U101b
R110 6.8kF
R111 240
R109 4.7k
D101
D102
R106 18k
R107 1k
Q101
Q102
PL101
PL102
PL103
+14.8
-14.8
R112 680F
CAL

U101	NJM4558L
Q101	2SC1740S (R, S)
Q102	2SC1740S (R, S)
Q103	2SC1318A (R)
Q104	2SA720A (R)
D101	1SS132
D102	1SS132
D103	LN322GP

VERTICAL UNIT (X73-2070-00)

CS-5230 SCHEMATIC DIAGRAM



(X73-2070-00 F/6)
VERTICAL UNIT (X73-2070-00 A/6)
(X73-2070-00 B/6)
(X73-2070-00 C/6)
(X73-2070-00 D/6)
(X73-2070-02 E/6)
P11 (7P)
JW10 (9P)
P12 (9P)
P9 (6P)

U1 :KMS01
U2 :SN74LS158N
U3 :SN74LS112AN
U4 :SN74LS00N
U101, 201 :KMC13
U102, 202 :KMC12
U401 :NJM072L
U402 :NJM072D
U403 :NJM4558L
U404, 405 :TC4053BP

Q1, 33, 215 :2SC1740S (R, S)
Q2, 3, 106, 107, 206, 207 :2SC3779 (D)
Q34 :2SA933S (R, S)
Q51, 101, 201, 302 :2SC1923 (O)
Q102, 202, 303 :2SK404 (E)
Q103, 203, 304, 307~309, 312 :2SC1907
Q108~111, 114, 208~211, 214, 305 306, 310, 311, 313, 314 :2SA1459 (K)

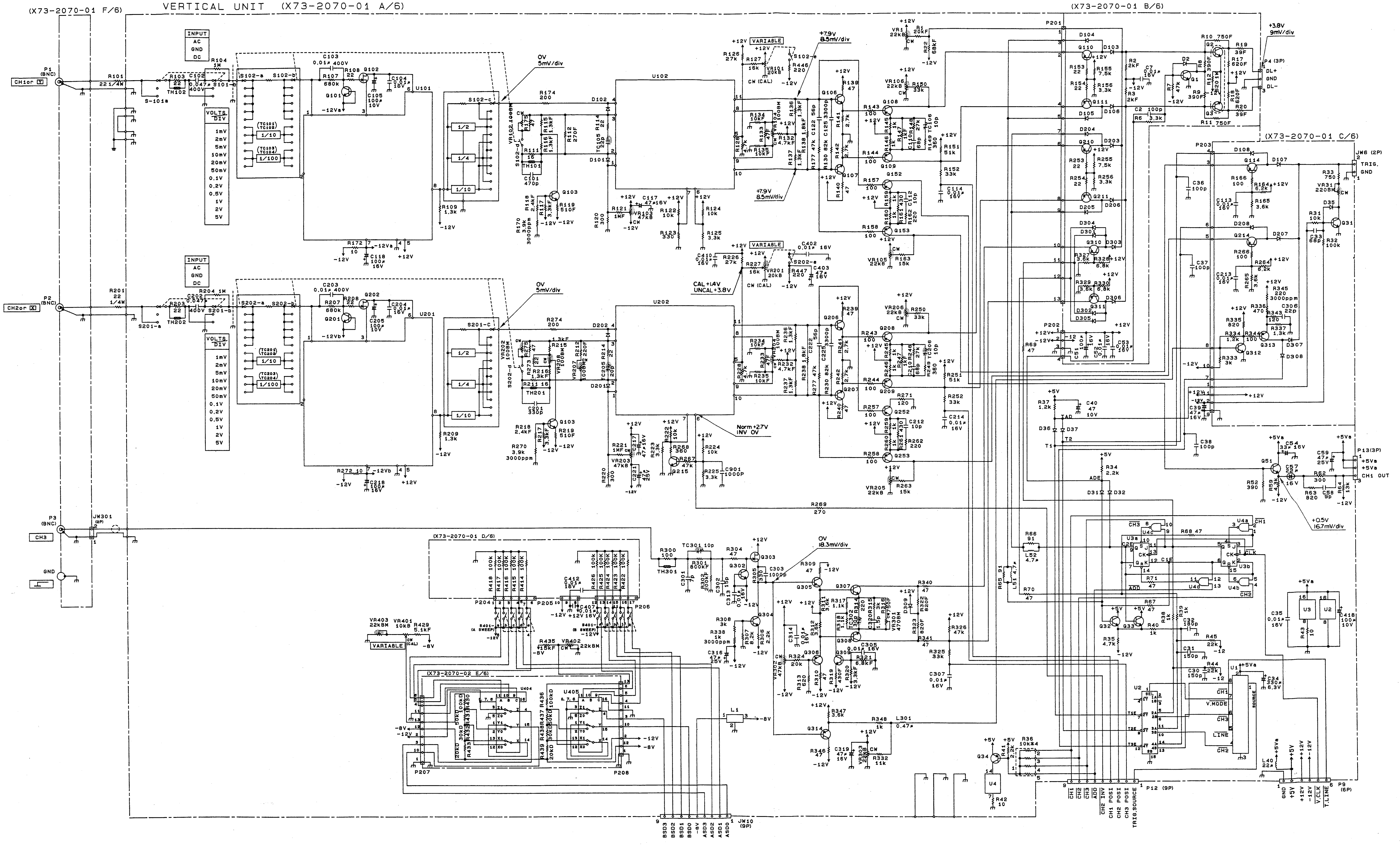
Q112, 113, 212, 213 :2SA1161

D2, 31, 32, 35~37, 101~108, 201~208 301~309 :1SS132

TH101, 201 :112-102-2
TH102, 202, 301 :112-201-2FM

VERTICAL UNIT (X73-2070-01)

CS-5235 SCHEMATIC DIAGRAM



(X73-2070-01 F/6)
VERTICAL UNIT (X73-2070-01 A/6)
(X73-2070-01 B/6)
(X73-2070-01 C/6)
(X73-2070-01 D/6)
(X73-2070-02 E/6)
CH1or Y
CH2or X
CH3
GND
P1 (BNC)
P2 (BNC)
P3 (BNC)
JW301 (2P)
INPUT
AC
GND
DC
VOLTS DIV
1mV
2mV
5mV
10mV
20mV
50mV
0.1V
0.2V
0.5V
1V
2V
5V
U101
U102
U201
U202
U404
U405
OV 5mV/div
+7.9V 8.5mV/div
CAL+1.4V UNCAL+3.8V
Norm+2.7V INV OV
OV 18.3mV/div
VARIABLE
+3.8V 9mV/div
P4 (3P)
DL+
GND
DL-
JW6 (2P)
TRIG.
GND
P13(3P)
+5Va
CH1 OUT
+0.5V 16.7mV/div
P12 (9P)
CH1
CH2
CH3
ADD
CH2 INV
CH1 POSI
CH2 POSI
CH3 POSI
TRIG.SOURCE
P9 (6P)
GND
+5V
+12V
-12V
V.CLK
T.LINE
JW10 (9P)
BSD3
BSD2
BSD1
BSD0
-8V
ASD3
ASD2
ASD1
ASD0

U1 :KMS01
U2 :SN74LS158N
U3 :SN74LS112AN
U4 :SN74LS00N
U101, 201 :KMC13
U102, 202 :KMC12
U404, 405 :TC4053BP

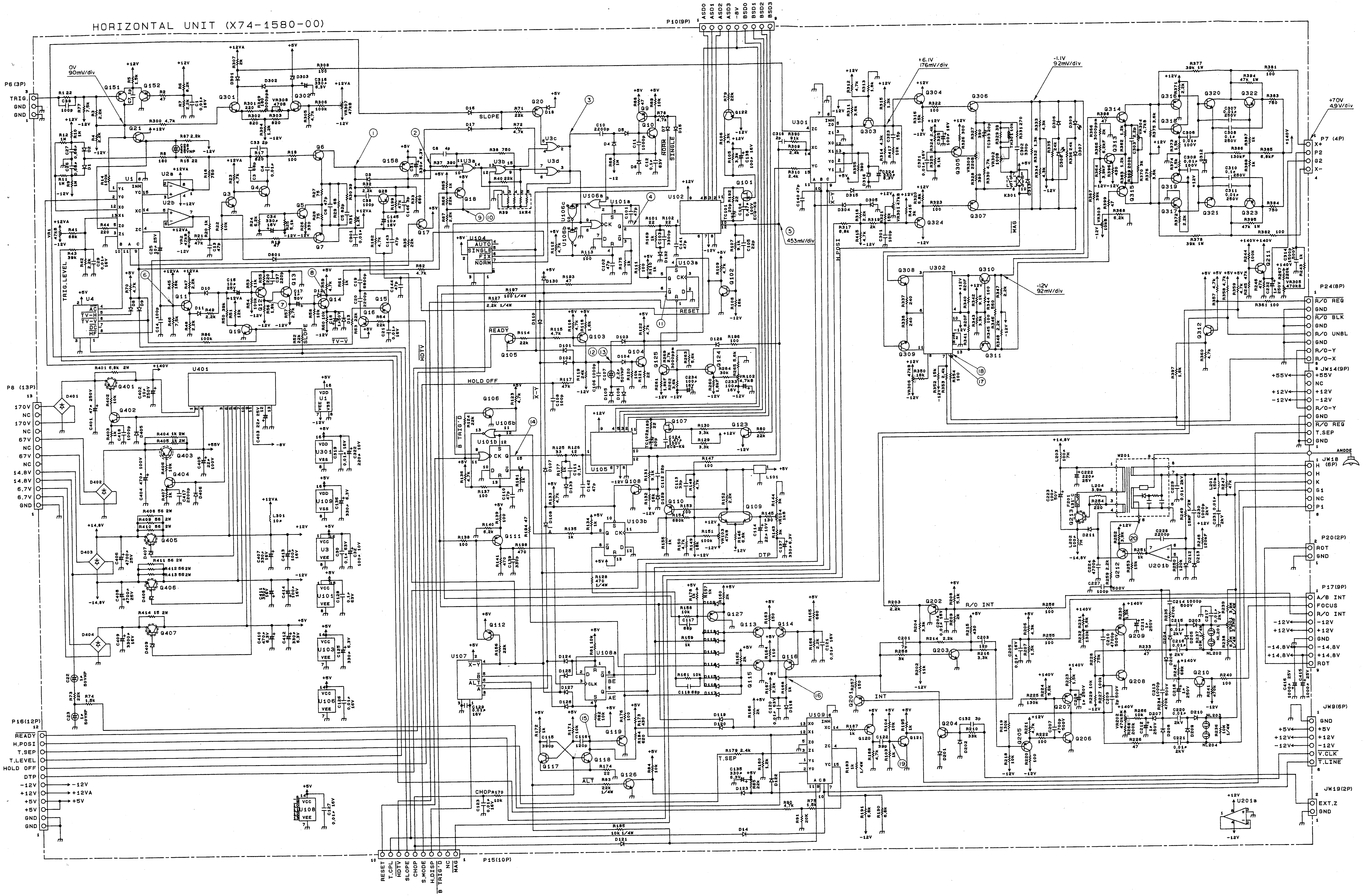
Q1, 33, 215 :2SC1740S (R, S)
Q2, 3, 106, 107, 206, 207 :2SC3779 (D)
Q32 :2SC3066 (G)
Q34 :2SA933S (R, S)
Q51, 101, 201, 302 :2SC1923 (O)
Q102, 202, 303 :2SK404 (E)

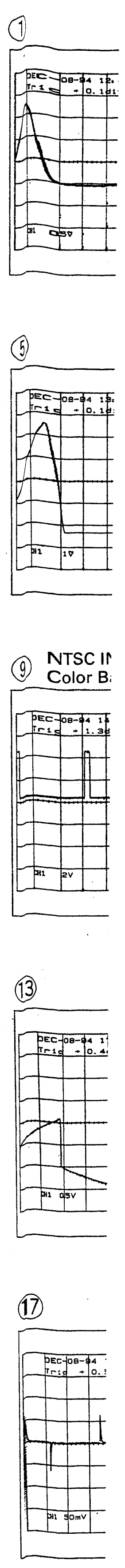
Q103, 203, 304, 307~309, 312 :2SC1907
Q108~111, 114, 208~211, 214, 305, 306, 310, 311, 313, 314 :2SA1459 (K)
Q112, 113, 212, 213 :2SA1161

D2, 31, 32, 35~37, 101~108, 201~208, 301~309 :1SS132

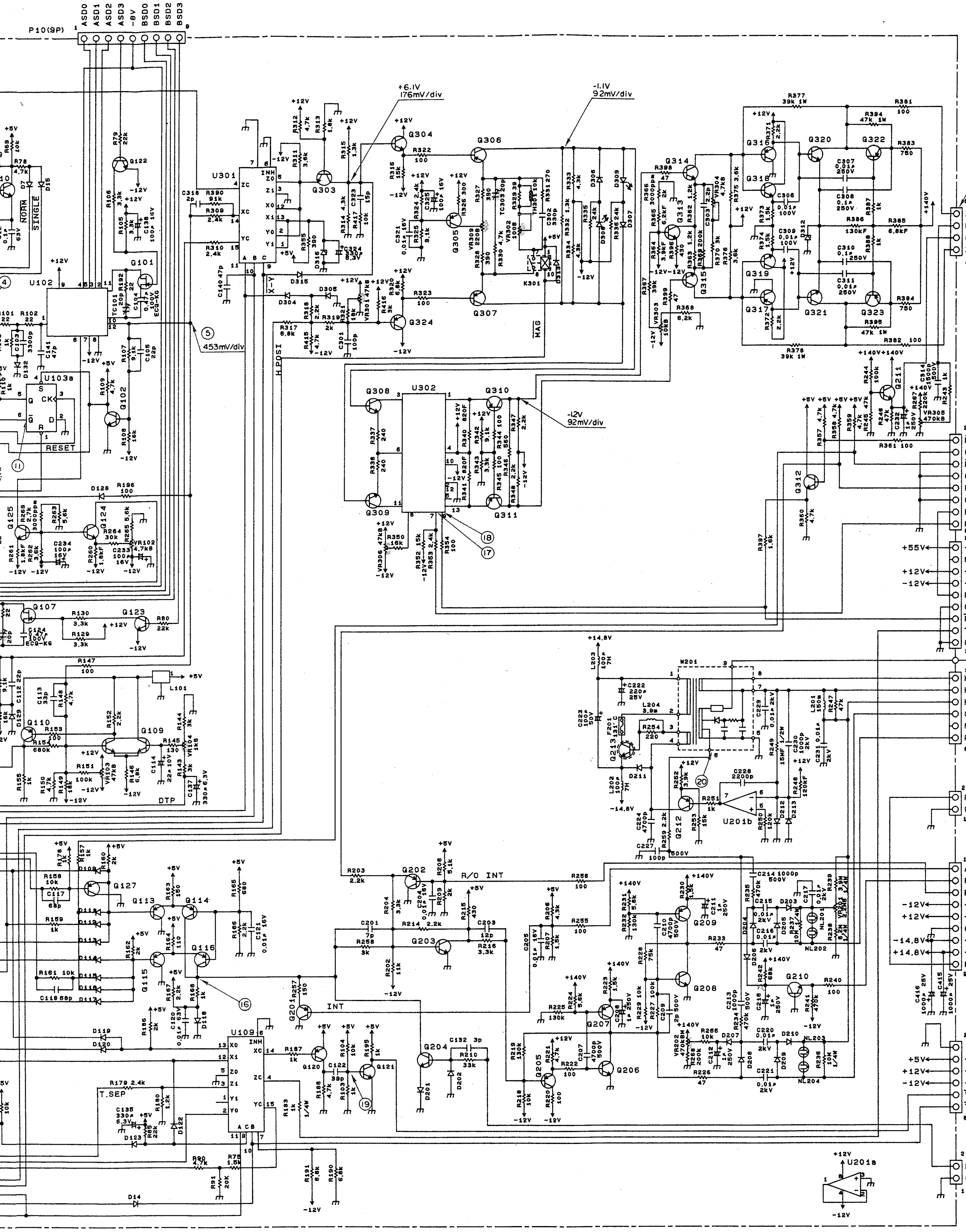
TH101, 201 :112-102-2
TH102, 202, 301:112-201-2FM

HORIZONTAL UNIT (X74-1580-00)


HORIZONTAL UNIT (X74-1580-00)
P10(9P)
ASD0
ASD1
ASD2
ASD3
-8V
BSD0
BSD1
BSD2
BSD3
P6 (3P)
TRIG
GND
GND
0V
90mV/div
TRIG. LEVEL
P8 (13P)
170V
NC
170V
NC
67V
NC
67V
NC
14.8V
14.8V
6.7V
6.7V
GND
P16(12P)
READY
H.POSI
T.SEP
T.LEVEL
HOLD OFF
DTP
-12V
+12V
+5V
+5V
GND
GND
P15(10P)
RESET
T.CPL
HDTV
SLOPE
CHOP
S.MODE
H.DISP
B TRIG'D
NC
MAG
U104
AUTO
SINGLE
FIX
NORM
HOLD OFF
READY
X-Y
ALT
SLOPE
SINGLE
NORM
RESET
INT
T.SEP
+6.1V
176mV/div
-1.1V
92mV/div
-12V
92mV/div
453mV/div
+70V
49V/div
P7 (4P)
X+
P2
G2
X-
P24(8P)
R/O REQ
GND
R/O BLK
GND
R/O UNBL
GND
R/O-Y
R/O-X
JW14(9P)
+55V
NC
+12V
-12V
R/O-Y
GND
R/O REQ
T.SEP
GND
ANODE
JW18 (6P)
H
H
K
G1
NC
P1
P20(2P)
ROT
GND
P17(9P)
A/B INT
FOCUS
R/O INT
-12V
+12V
GND
+14.8V
+14.8V
ROT
JW9(6P)
GND
+5V
+12V
-12V
V.CLK
T.LINE
JW19(2P)
EXT.Z
GND
R/O INT
MAG
H.POSI
TV-H
TV-V
DTP

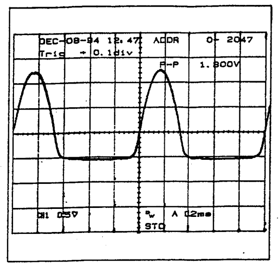


U1	:TC4053BP
U2	:NJM072BD
U3	:MC10H102L
U4, 104, 107	:KMS01
U101	:MC10H131L
U102, 105	:KMD05
U103, 108	:SN74ALS74AN
U106	:SN74ALS02N
U109, 301	:TC74HC4053AP
U201	:NJM4558D
U302	:KMG01
U401	:KMA02
Q3, 10, 11, 13, 14, 19, 104~106 122~126, 204, 301~304, 308, 309 312, 313	:2SC1740S (R, R)
Q4, 5, 102, 108, 117, 118, 121, 203	:2SC1923 (O)
Q6, 7	:2SC3779 (D)
Q9, 28, 110, 120, 151, 152, 158, 316 317	:2SA1459 (K)
Q12, 15, 16, 113~116, 127, 306, 307	:2SA1005 (K)
Q17, 18, 20, 103, 111, 112, 119, 201 202, 205, 212, 305, 310, 311, 324	:2SA933S (R, S)
Q21, 314, 315, 318, 319	:2SC1907
Q101, 107	:2SK170 (V)
Q109	:2SC3066 (G)
Q206, 208	:2SC2910 (S)
Q207, 209	:2SA1208 (S)
Q210, 211, 402, 404	:2SC2551 (O)
Q213	:2SD613 (E)
Q320, 321	:2SC4732 (E)
Q322, 323	:2SA1828 (E)
Q401	:2SA1499 (P)
Q403	:2SA1304
Q405, 407	:2SB1015 (Y)
Q406	:2SD1406 (Y)
D1~5, 12, 109, 114, 130, 132, 133 301, 306, 307, 801	:MA700
D6~11, 13~18, 101~108, 110~113 115~129, 201, 202, 211, 212, 213 302, 304, 305, 313, 315, 405, 406	:1SS132
D203~210	:1SS83
D303, 316	:MTZ3.0JA
D308, 309	:TLR112
D312	:MTZ5.1JB
D401, 402, 404	:S1VB60
D403	:S4VB20F
D407, 408	:MTZ13JC
D409	:MTZ7.5JA
TH301	:112-103-2FM

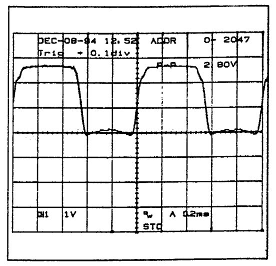

P10(9P)
ASD0
ASD1
ASD2
ASD3
-8V
BSD0
BSD1
BSD2
BSD3
+6.1V 176mV/div
-1.1V 92mV/div
+70V 49V/div
P7 (4P)
X+
P2
G2
X-
453mV/div
-12V 92mV/div
U301
U302
U102
U109
U103a
RESET
NORM
SINGLE
H.POSI
MAG
DTP
P24(8P)
R/O REG
GND
R/O BLK
GND
R/O UNBL
GND
R/O-Y
R/O-X
JW14(9P)
+55V
NC
+12V
-12V
R/O-Y
GND
R/O REG
T.SEP
GND
ANODE
JW18 (6P)
H
H
K
G1
NC
P1
M201
U201b
P20(2P)
ROT
GND
P17(9P)
A/B INT
FOCUS
R/O INT
-12V
+12V
GND
-14.8V
+14.8V
ROT
JW9(6P)
GND
+5V
+12V
-12V
V.CLK
T.LINE
JW19(2P)
EXT.Z
GND
U201a
T.SEP
INT

CS-5230 SCHEMATIC DIAGRAM

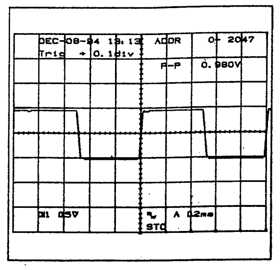
①



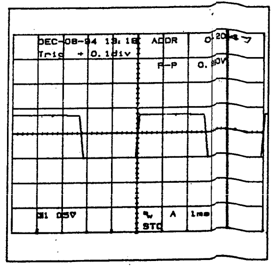
②



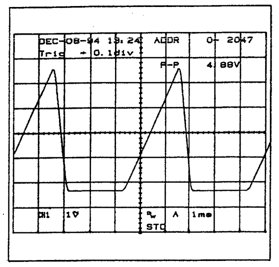
③



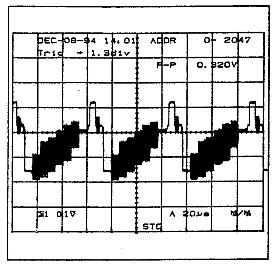
④



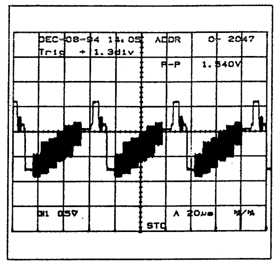
⑤



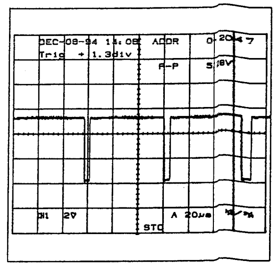
⑥



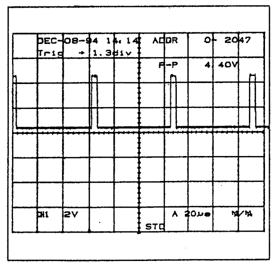
⑦



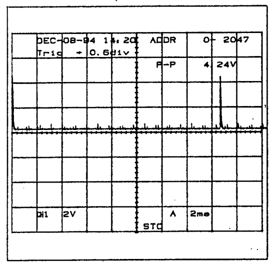
⑧



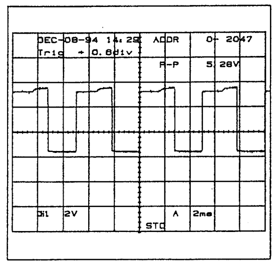
⑨ NTSC INPUT 4div, Color Bar TV-H



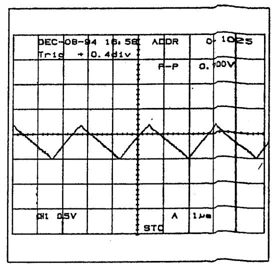
⑩ NTSC INPUT 4div, Color Bar TV-V



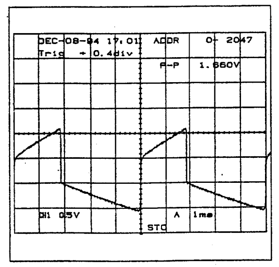
⑪



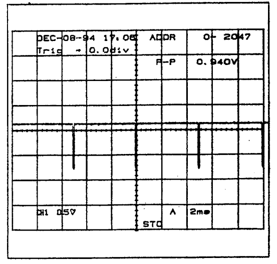
⑫



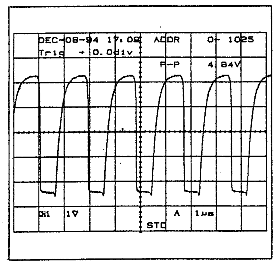
⑬



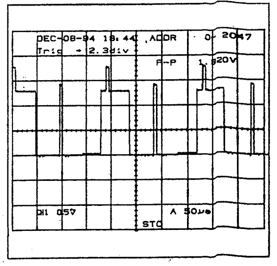
⑭ A: 0.2ms/div B: 5µs/div, ALT MODE



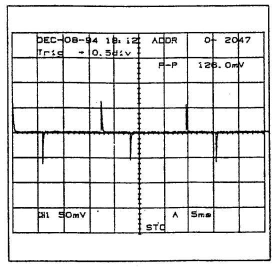
⑮ CH1/CH2: ON, CHOP ON



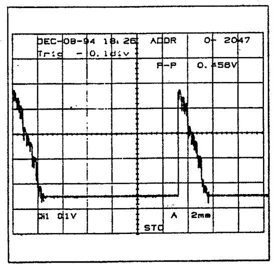
⑯ A: 0.5ms/div B: 50µs/div, ALT MODE



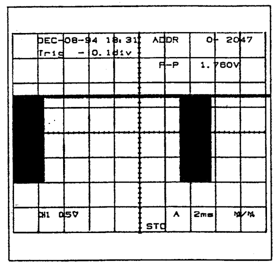
⑰



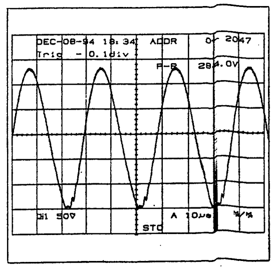
⑱



⑲



⑳



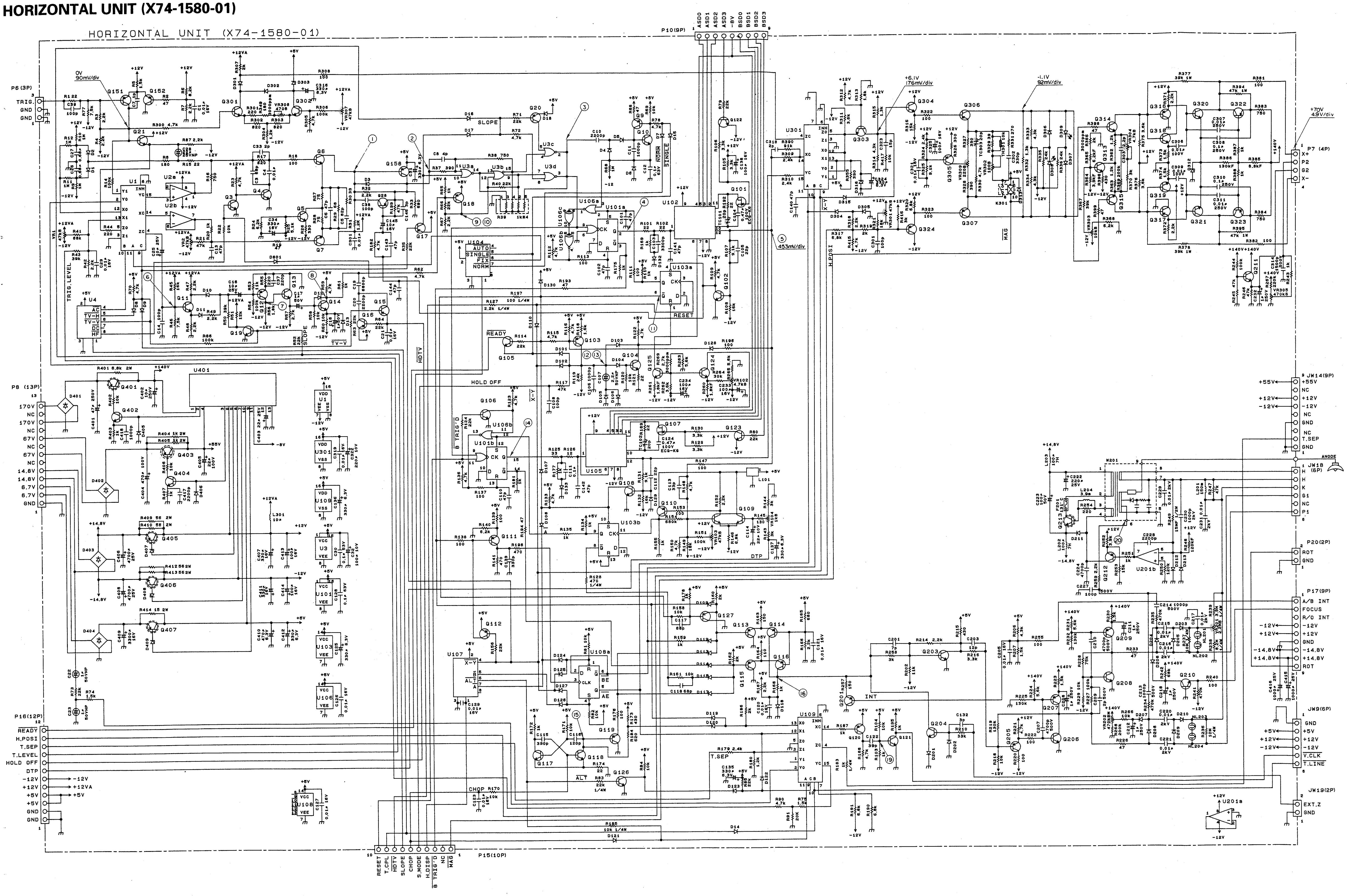
Q403 :2SA1304
Q405, 407 :2SB1015 (Y)
Q406 :2SD1406 (Y)

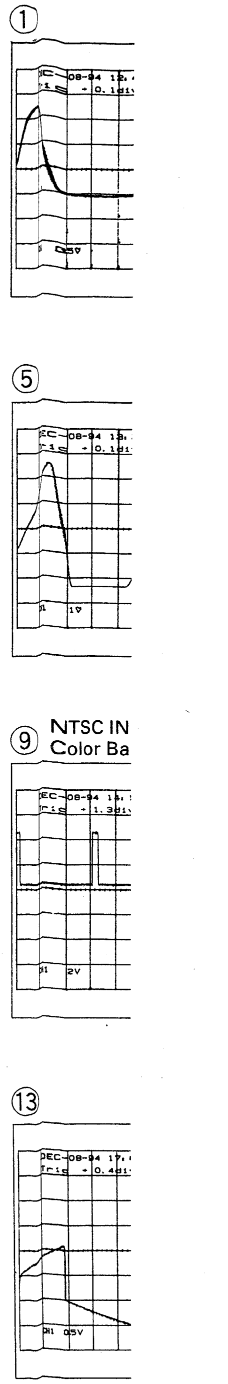
D1~5, 12, 109, 114, 130, 132, 133
301, 306, 307, 801
:MA700
D6~11, 13~18, 101~108, 110~113
115~129, 201, 202, 211, 212, 213
302, 304, 305, 313, 315, 405, 406
:1SS132
D203~210 :1SS83

D303, 316 :MTZ3.0JA
D308, 309 :TLR112
D312 :MTZ5.1JB
D401, 402, 404 :S1VB60
D403 :S4VB20F
D407, 408 :MTZ13JC
D409 :MTZ7.5JA

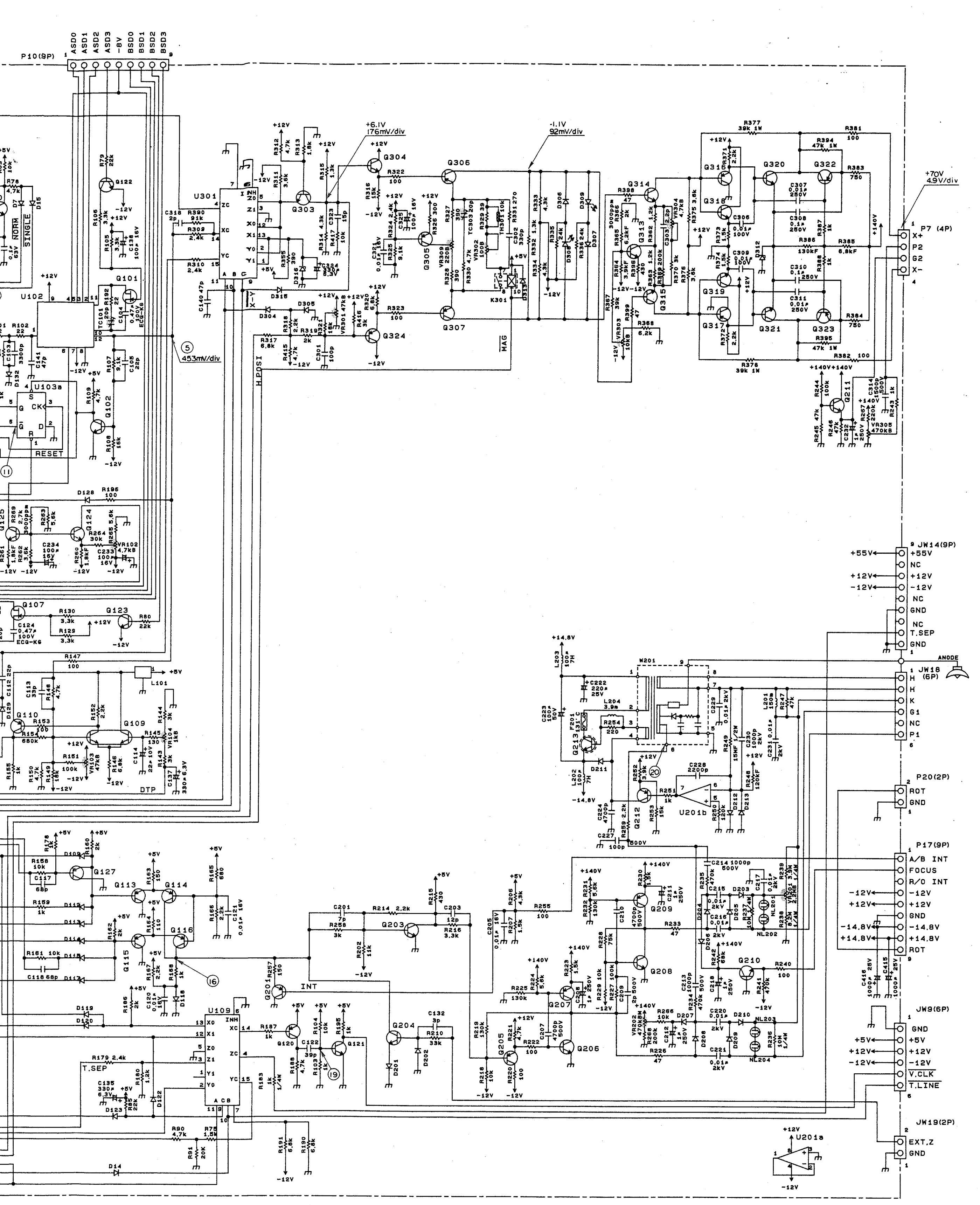
TH301 :112-103-2FM

HORIZONTAL UNIT (X74-1580-01)


HORIZONTAL UNIT (X74-1580-01)
P10(9P)
ASD0
ASD1
ASD2
ASD3
+5V
BSD0
BSD1
BSD2
BSD3
P6(3P)
TRIG.
GND
GND
0V
90mV/div
SLOPE
NORM
SINGLE
+6.1V
176mV/div
-1.1V
92mV/div
+70V
4.9V/div
453mV/div
P7 (4P)
X+
P2
G2
X-
TRIG.LEVEL
AUTO
SINGLE
FIX
NORM
RESET
HDTV
READY
HOLD OFF
X-Y
B TRIG'D
H.POSI
HAG
P8 (13P)
170V
NC
170V
NC
67V
NC
67V
NC
14.8V
14.8V
6.7V
6.7V
GND
JW14(9P)
+55V
NC
+12V
-12V
NC
GND
NC
T.SEP
GND
ANODE
JW18 (6P)
H
H
K
G1
NC
P1
P20(2P)
ROT
GND
P17(9P)
A/B INT
FOCUS
R/O INT
-12V
+12V
GND
-14.8V
+14.8V
ROT
INT
DTP
T.SEP
ALT
CHOP
JW9(6P)
GND
+5V
+12V
-12V
V.CLK
T.LINE
JW19(2P)
EXT.Z
GND
P16(12P)
READY
H.POSI
T.SEP
T.LEVEL
HOLD OFF
DTP
-12V
+12V
+5V
+5V
GND
GND
P15(10P)
RESET
T.CPL
HDTV
SLOPE
CHOP
S.MODE
H.DISP
B TRIG'D
NC
MAG



U1	:4053BP
U2	:NJM072BD
U3	:MC10H102L
U4, 107, 104	:KMS01
U101	:MC10H131L
U102, 105	:KMD05
U103, 108	:SN74ALS74AN
U106	:SN74ALS02N
U109, 301	:TC74HC4053AP
U201	:NJM4558D
U401	:KMA02
Q3, 10, 11, 13, 14, 19, 104~106, 122 123~126, 204, 301~304, 313	:2SC1740S (R, S)
Q4, 5, 102, 108, 117, 118, 121, 203	:2SC1923 (O)
Q6, 7	:2SC3779 (D)
Q9, 28, 110, 120, 151, 152, 158, 316 317	:2SA1459 (K)
Q12, 15, 16, 113~116, 127, 306, 307	:2SA1005 (K)
Q17, 18, 20, 103, 111, 112, 119, 201 205, 212, 305, 324	:2SA933S (R, S)
Q21, 314, 315, 318, 319	:2SC1907
Q101, 107	:2SK170 (V)
Q109	:2SC3066 (G)
Q206, 208	:2SC2910 (S)
Q207, 209	:2SA1208 (S)
Q210, 211, 402, 404	:2SC2551 (O)
Q213	:2SD613 (E)
Q320, 321	:2SC4732 (E)
Q322, 323	:2SA1828 (E)
Q401	:2SA1499 (P)
Q403	:2SA1304
Q405, 407	:2SB1015 (Y)
Q406	:2SD1406 (Y)
D1~5, 12, 109, 114, 130, 132, 133 301, 306, 307, 801	:MA700
D6~11, 13~18, 101~108, 110, 112 113, 115, 117~129, 201, 202, 211 212, 213, 302, 304, 305, 313, 315 405, 406	:1SS132
D203~210	:1SS83
D303, 316	:MTZ3.0JA
D308, 309	:TLR112
D312	:MTZ5.1JB
D401, 402, 404	:S1VB60
D403	:S4VB20F
D407, 408	:MTZ13JC
D409	:MTZ7.5JA
NL201~204	:NE-38
TH301	:112-103-2FM



Q403 :2SA1304
Q405, 407 :2SB1015 (Y)
Q406 :2SD1406 (Y)

D1~5, 12, 109, 114, 130, 132, 133
301, 306, 307, 801
:MA700
D6~11, 13~18, 101~108, 110, 112
113, 115, 117~129, 201, 202, 211
212, 213, 302, 304, 305, 313, 315
405, 406 :1SS132

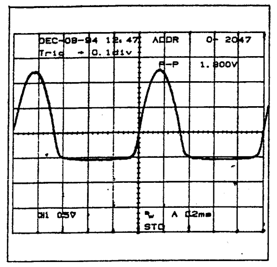
D203~210 :1SS83
D303, 316 :MTZ3.0JA
D308, 309 :TLR112
D312 :MTZ5.1JB
D401, 402, 404 :S1VB60
D403 :S4VB20F
D407, 408 :MTZ13JC
D409 :MTZ7.5JA

NL201~204 :NE-38

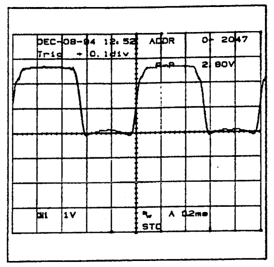
TH301 :112-103-2FM

CS-5235 SCHEMATIC DIAGRAM

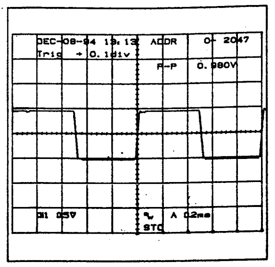
①



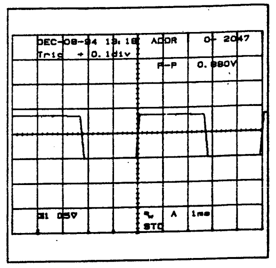
②



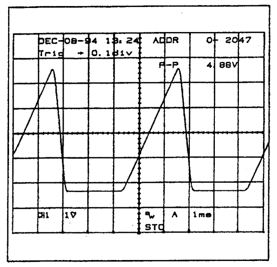
③



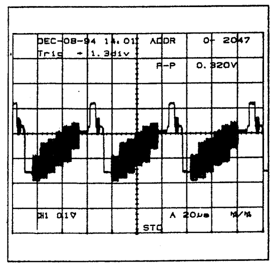
④



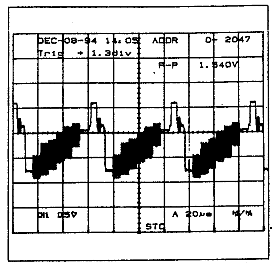
⑤



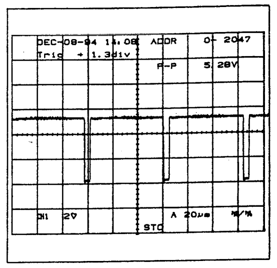
⑥



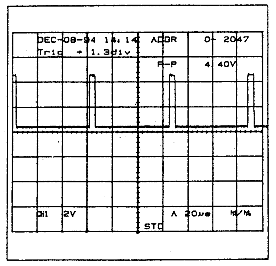
⑦



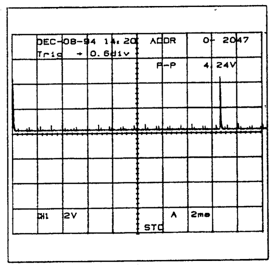
⑧



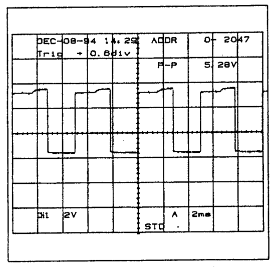
⑨ NTSC INPUT 4div,
Color Bar TV-H



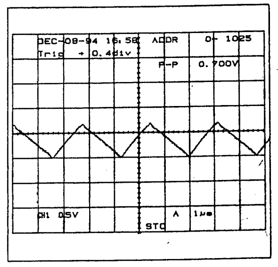
⑩ NTSC INPUT 4div,
Color Bar TV-V



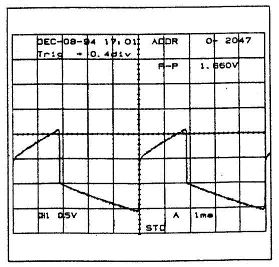
⑪



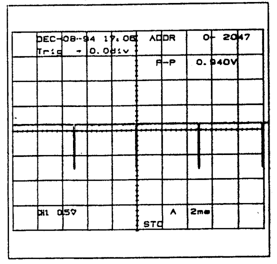
⑫



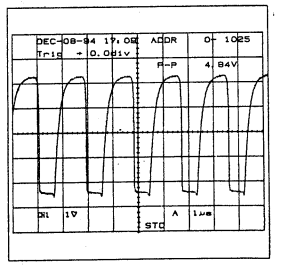
⑬



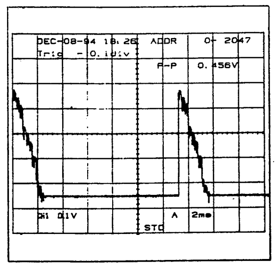
⑭ A: 0.2ms/div
B: 5μs/div, ALT MODE



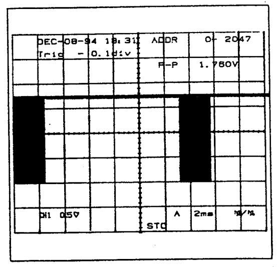
⑮ CH1/CH2: ON, CHOP ON



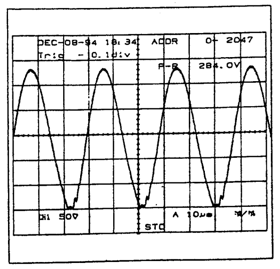
⑱



⑲

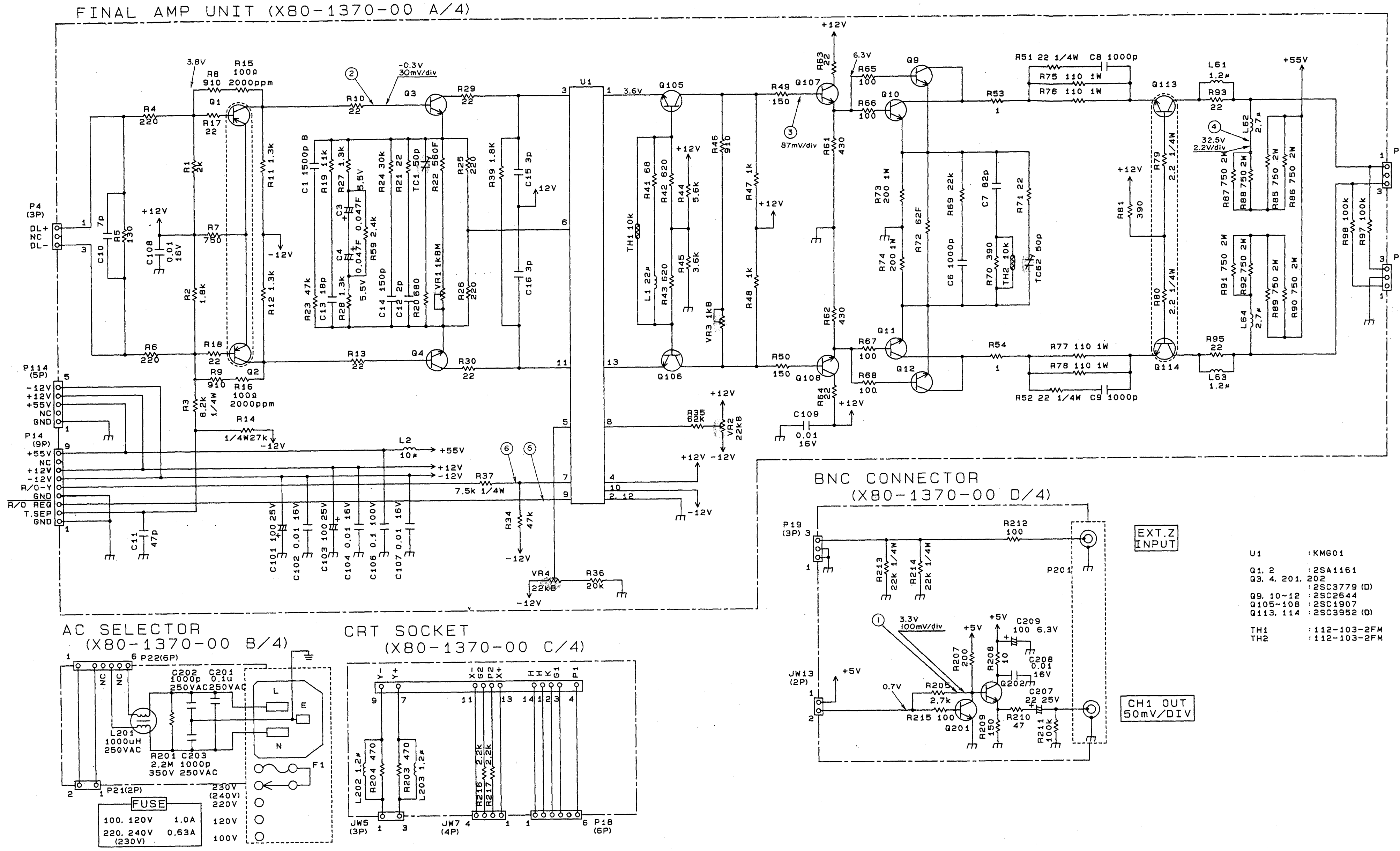


⑳



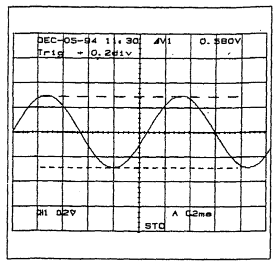
CS-5230 SCHEMATIC DIAGRAM

FINAL AMP UNIT (X80-1370-00)

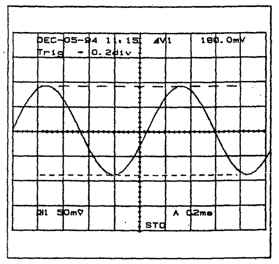

FINAL AMP UNIT (X80-1370-00 A/4)
AC SELECTOR (X80-1370-00 B/4)
CRT SOCKET (X80-1370-00 C/4)
BNC CONNECTOR (X80-1370-00 D/4)
EXT.Z INPUT
CH1 OUT 50mV/DIV
FUSE
100, 120V 1.0A
220, 240V (230V) 0.63A
P4 (3P)
P114 (5P)
P14 (9P)
P5 (3P)
P105(3P)
P19 (3P)
JW13 (2P)
P21(2P)
P22(6P)
JW5 (3P)
JW7 (4P)
P18 (6P)
U1
+12V
-12V
+55V

U1	:KMG01
Q1, 2	:2SA1161
Q3, 4, 201, 202	:2SC3779 (D)
Q9, 10~12	:2SC2644
Q105~108	:2SC1907
Q113, 114	:2SC3952 (D)
TH1	:112-103-2FM
TH2	:112-103-2FM

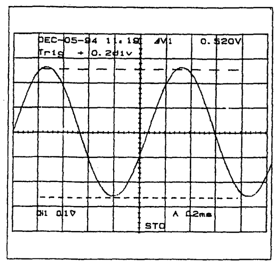
① INPUT: 1kHz 6div 5mV/div



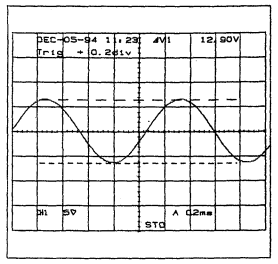
②



③

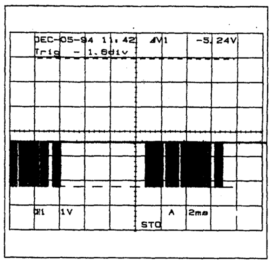


④

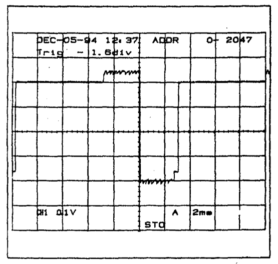


⑤

GND →
CH1
ΔV1 cursor
+3div, -3div

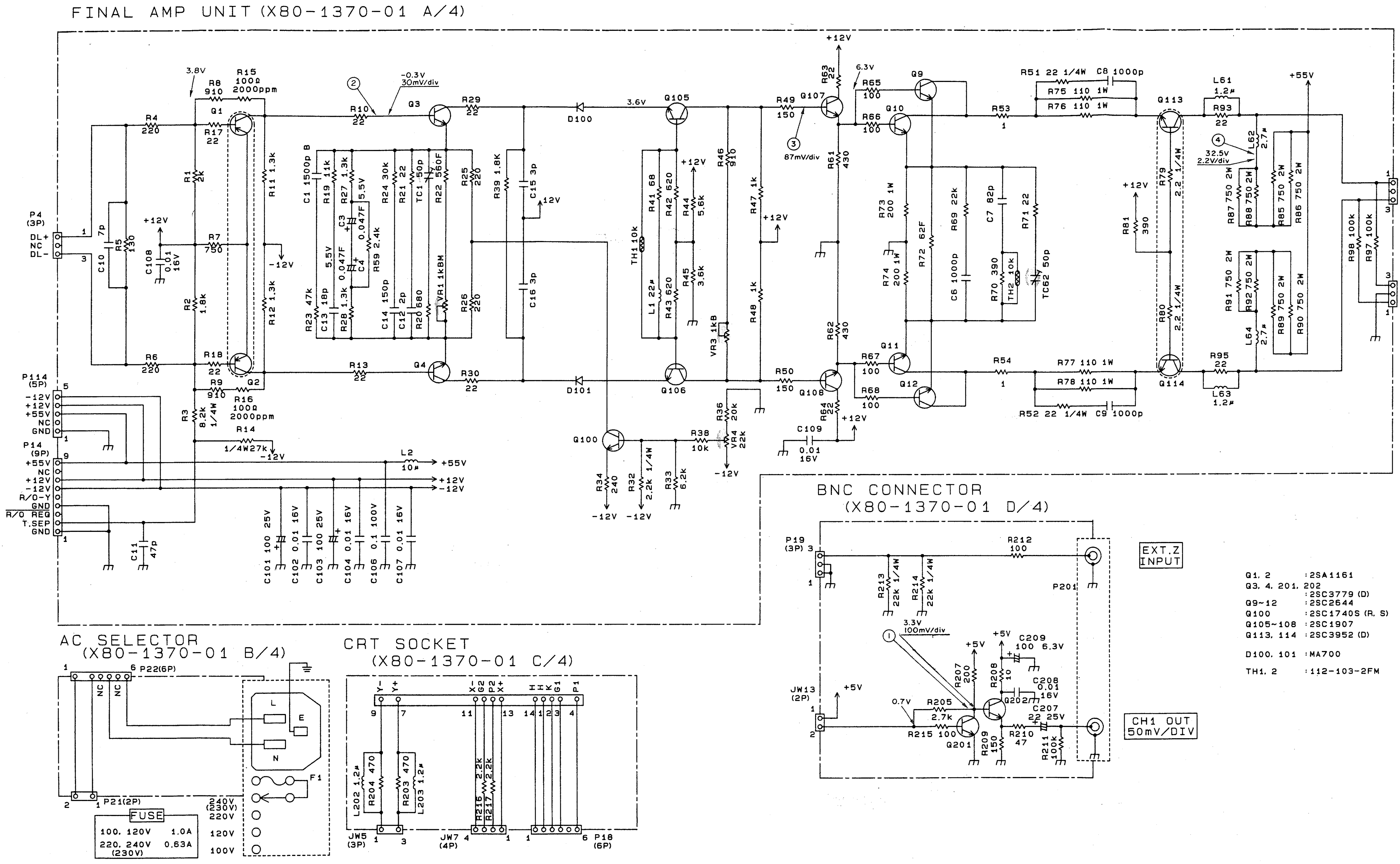


⑥



CS-5235 SCHEMATIC DIAGRAM

FINAL AMP UNIT (X80-1370-01)

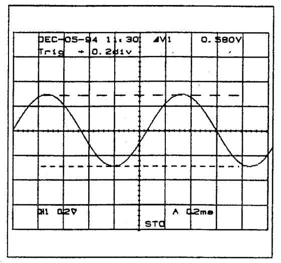

FINAL AMP UNIT (X80-1370-01 A/4)
P4 (3P)
DL+
NC
DL−
1
3
C10 7p
R5 130
R4 220
R6 220
C108 0.01 16V
+12V
3.8V
R8 910
R15 100Ω 2000ppm
Q1
R17 22
R1 2k
R7 750
R2 1.8k
R18 22
R9 910
Q2
R16 100Ω 2000ppm
R11 1.3k
R12 1.3k
−12V
R3 8.2k 1/4W
R14 1/4W27k
−12V
②
−0.3V 30mV/div
R10 22
R13 22
Q3
Q4
C1 1500p B
R19 11k
R27 1.3k
5.5V
C3 0.047F
R59 2.4k
C4 0.047F
5.5V
R23 47k
C13 18p
R28 1.3k
R24 30k
C14 150p
R21 22
C12 2p
TC1 50p
R20 680
R22 560F
VR1 1kBM
R25 220
R26 220
R29 22
R30 22
R39 1.8K
C15 3p
C16 3p
12V
D100
D101
3.6V
Q105
Q106
TH1 10k
R41 68
L1 22μ
R42 620
R43 620
+12V
R44 5.6k
R45 3.6k
R46 910
VR3 1kB
R47 1k
R48 1k
+12V
Q100
R34 240
R32 2.2k 1/4W
R33 6.2k
R38 10k
R36 20k
VR4 22k
−12V −12V
−12V
R49 150
R50 150
③
87mV/div
Q107
Q108
+12V
R63 22
R61 430
R62 430
R64 22
C109 0.01 16V
+12V
6.3V
R65 100
R66 100
R67 100
R68 100
Q9
Q10
Q11
Q12
R73 200 1W
R74 200 1W
R72 62F
C6 1000p
R69 22k
C7 82p
R70 390
TH2 10k
R71 22
TC62 50p
R53 1
R54 1
R51 22 1/4W
C8 1000p
R75 110 1W
R76 110 1W
R77 110 1W
R78 110 1W
R52 22 1/4W
C9 1000p
+12V
R81 390
Q113
Q114
R79 2.2 1/4W
R80 2.2 1/4W
L61 1.2μ
R93 22
④
32.5V 2.2V/div
L62 2.7μ
+55V
R87 750 2W
R88 750 2W
R85 750 2W
R86 750 2W
R91 750 2W
R92 750 2W
R89 750 2W
R90 750 2W
L64 2.7μ
R95 22
L63 1.2μ
R98 100k
R97 100k
P5 (3P)
Y−
NC
Y+
P105 (3P)
Y−
GND
Y+
P114 (5P)
−12V
+12V
+55V
NC
GND
P14 (9P)
+55V
NC
+12V
−12V
R/O-Y
GND
R/O REQ
T.SEP
GND
C11 47p
L2 10μ
+55V
+12V
−12V
C101 100 25V
C102 0.01 16V
C103 100 25V
C104 0.01 16V
C106 0.1 100V
C107 0.01 16V
BNC CONNECTOR (X80-1370-01 D/4)
P19 (3P)
R212 100
R213 22k 1/4W
R214 22k 1/4W
P201
EXT.Z INPUT
①
3.3V 100mV/div
+5V
+5V
C209 100 6.3V
R207 200
R208 10
C208 0.01 16V
JW13 (2P)
+5V
0.7V
R205 2.7k
R215 100
Q201
Q202
C207 22 25V
R209 150
R210 47
R211 100k
CH1 OUT 50mV/DIV
AC SELECTOR (X80-1370-01 B/4)
P22(6P)
NC
NC
L
E
N
F1
P21(2P)
FUSE
100. 120V 1.0A
220. 240V 0.63A (230V)
240V (230V)
220V
120V
100V
CRT SOCKET (X80-1370-01 C/4)
Y−
Y+
X−
G2
P2
X+
H
H
K
G1
P1
L202 1.2μ
R204 470
R203 470
L203 1.2μ
R216 2.2k
R217 2.2k
JW5 (3P)
JW7 (4P)
P18 (6P)

Q1, 2 :2SA1161
Q3, 4, 201, 202
:2SC3779 (D)
Q9~12 :2SC2644
Q100 :2SC1740S (R, S)
Q105~108 :2SC1907
Q113, 114 :2SC3952 (D)

D100, 101 :MA700

TH1, 2 :112-103-2FM

① INPUT: 1kHz 6div 5mV/div



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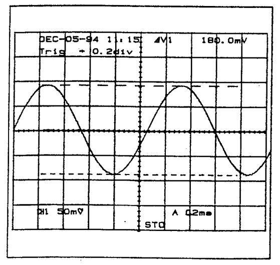

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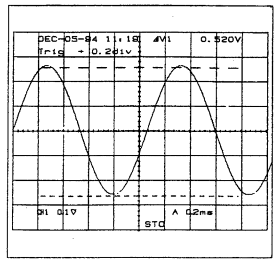

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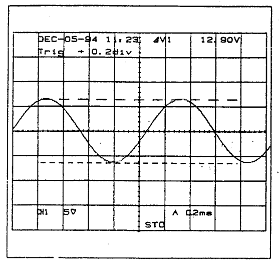
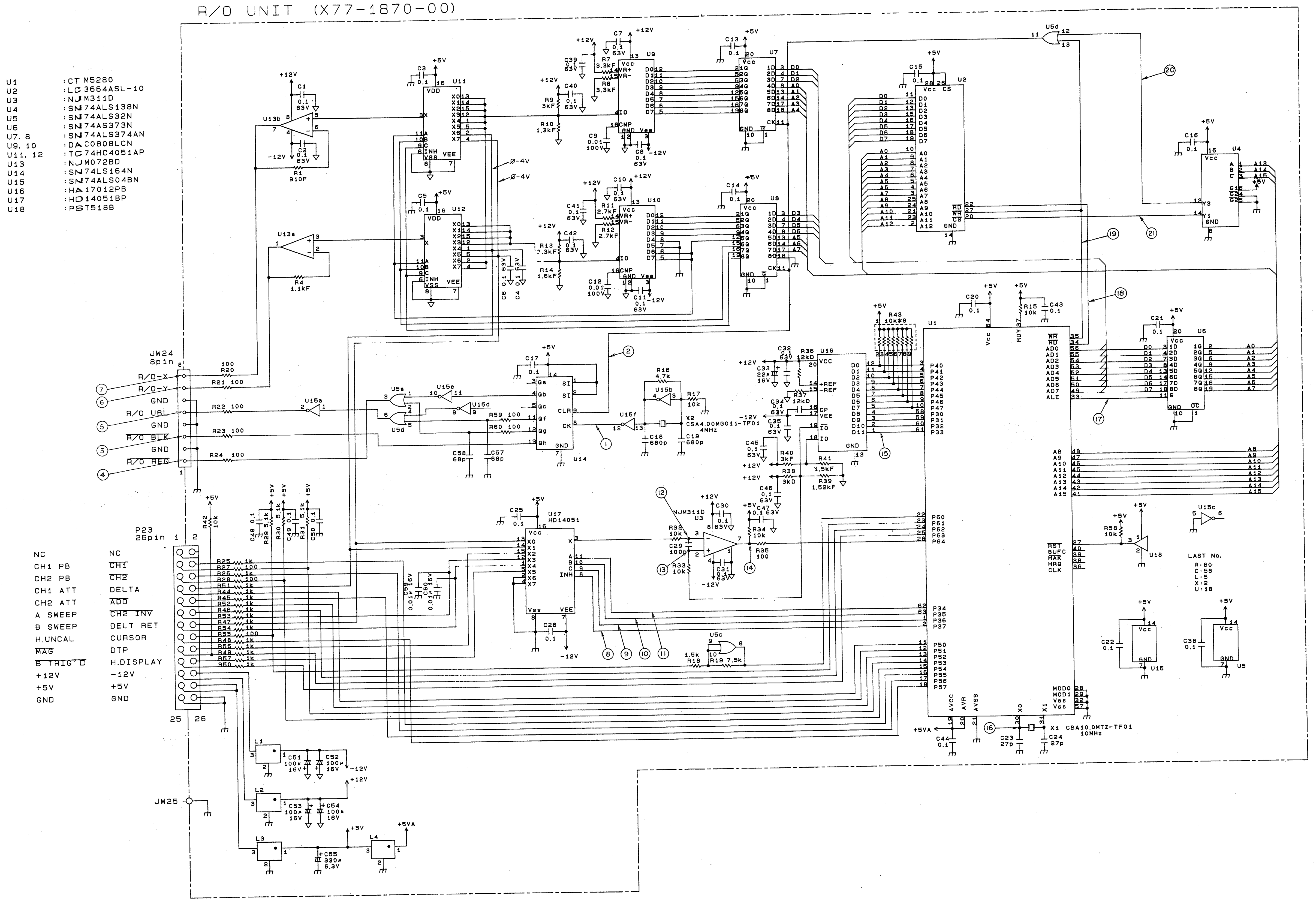


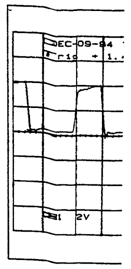
CS-5230 SCHEMATIC DIAGRAM

R/O UNIT (X77-1870-00)


R/O UNIT (X77-1870-00)
JW24
8pin
R/O-X
R/O-Y
GND
R/O UBL
GND
R/O BLK
GND
R/O REQ
P23
26pin
NC
CH1 PB
CH2 PB
CH1 ATT
CH2 ATT
A SWEEP
B SWEEP
H.UNCAL
MAG
B TRIG'D
+12V
+5V
GND
NC
CH1
CH2
DELTA
ADD
CH2 INV
DELT RET
CURSOR
DTP
H.DISPLAY
-12V
+5V
GND
JW25
X1 CSA10.0MTZ-TF01 10MHz
X2 CSA4.00MG011-TF01 4MHz
LAST No.
R:60
C:58
L:5
X:2
U:18

U1	:CTM5280
U2	:LC3664ASL-10
U3	:NJM311D
U4	:SN74ALS138N
U5	:SN74ALS32N
U6	:SN74AS373N
U7, 8	:SN74ALS374AN
U9, 10	:DAC0808LCN
U11, 12	:TC74HC4051AP
U13	:NJM072BD
U14	:SN74LS164N
U15	:SN74ALS04BN
U16	:HA17012PB
U17	:HD14051BP
U18	:PST518B

①



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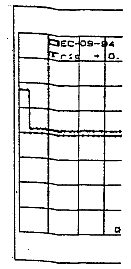

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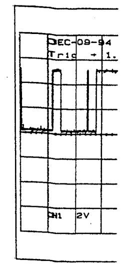

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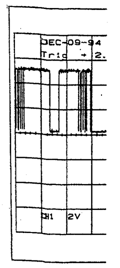

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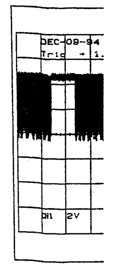
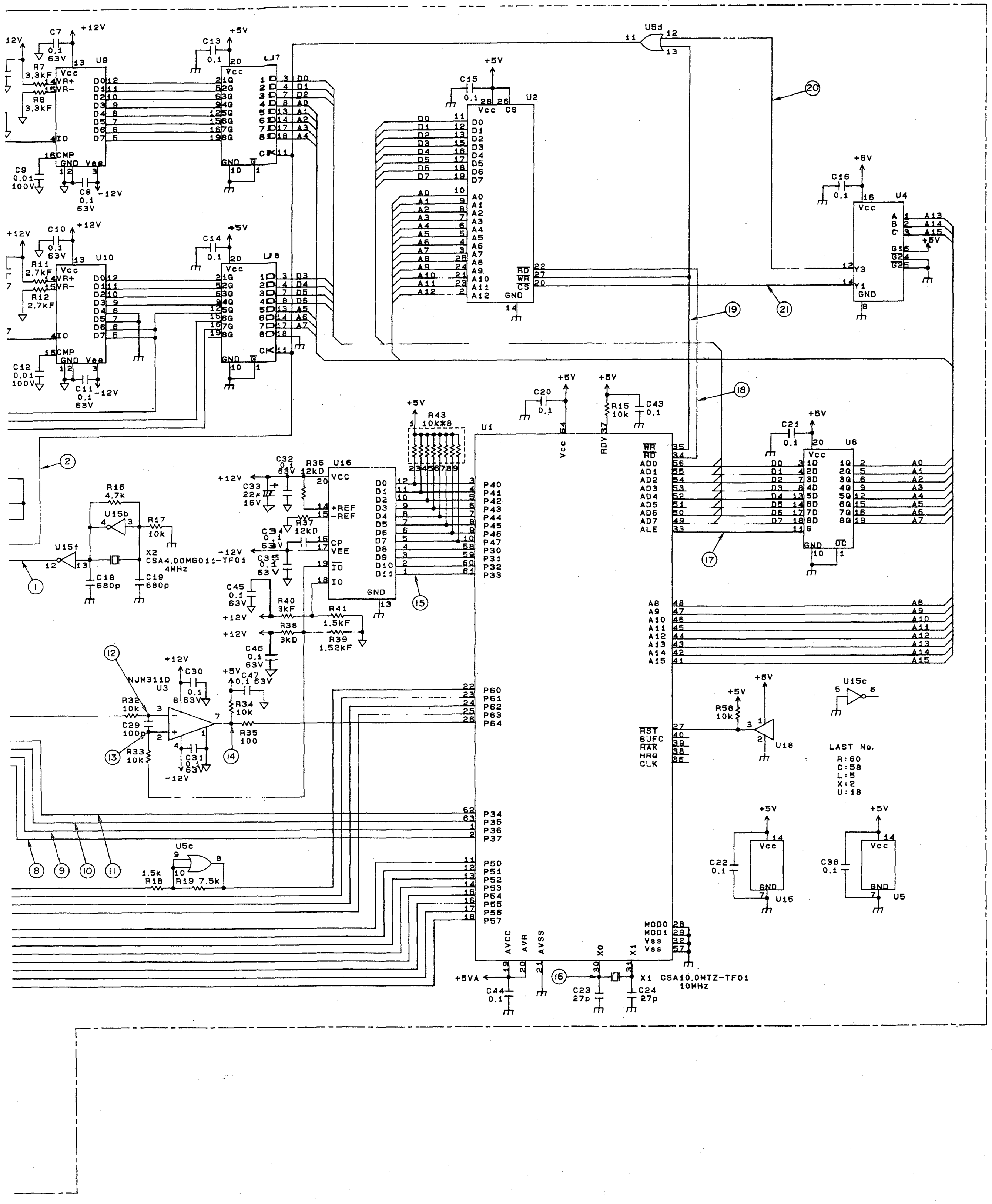


CS-5230 SCHEMATIC DIAGRAM


U9
U10
U7
U8
U5d
U2
U4
U6
U1
U16
U15b
U15f
U3
NJM311D
U18
U15c
U5c
U15
U5
R43 10k×8
X1 CSA10.0MTZ-TF01 10MHz
X2 CSA4.00MG011-TF01 4MHz
+5V
+12V
-12V
+5VA
LAST No.
R:60
C:58
L:5
X:2
U:18
RD
WR
ALE
RST
BUFC
HAR
HRQ
CLK
MOD0
MOD1
Vss
AVCC
AVR
AVSS
X0
X1
RDY
Vcc
GND
P40
P41
P42
P43
P44
P45
P46
P47
P30
P31
P32
P33
P60
P61
P62
P63
P64
P34
P35
P36
P37
P50
P51
P52
P53
P54
P55
P56
P57
AD0
AD1
AD2
AD3
AD4
AD5
AD6
AD7
A8
A9
A10
A11
A12
A13
A14
A15
①
②
⑧
⑨
⑩
⑪
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⑬
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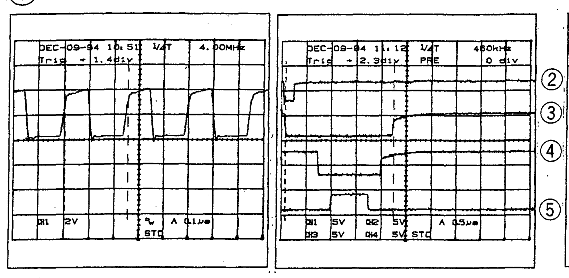
①



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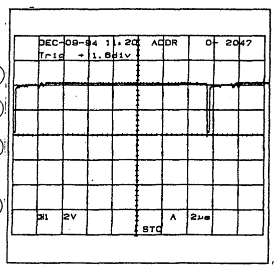

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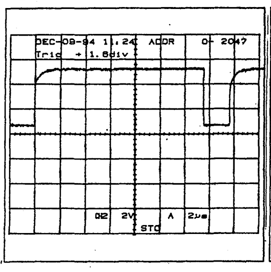

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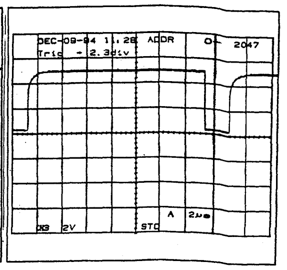

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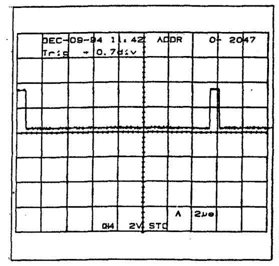

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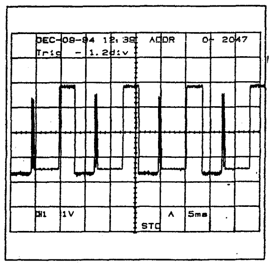

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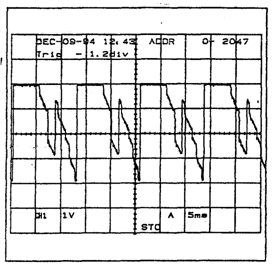

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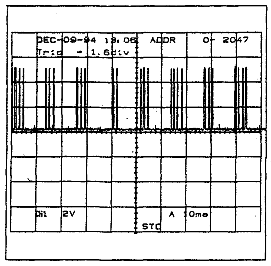

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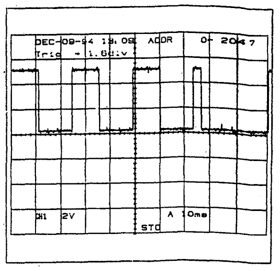

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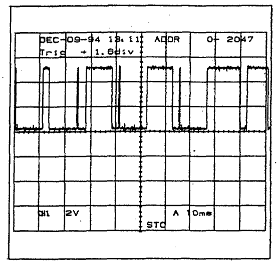

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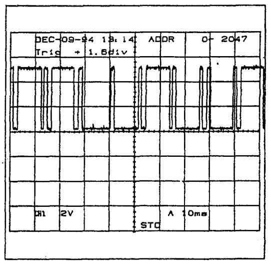

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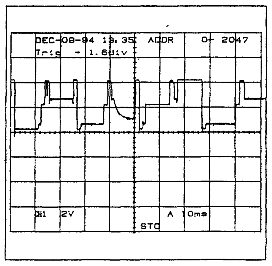

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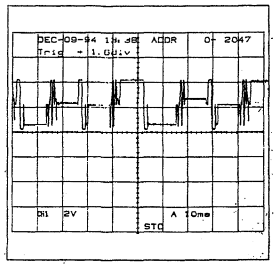

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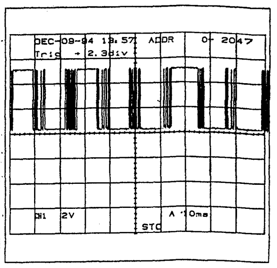

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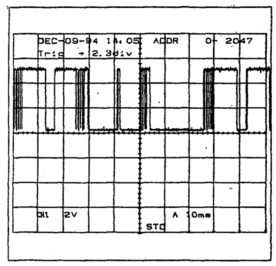

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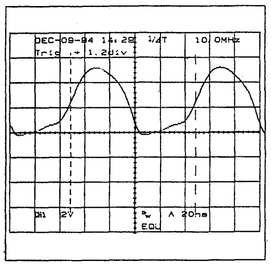

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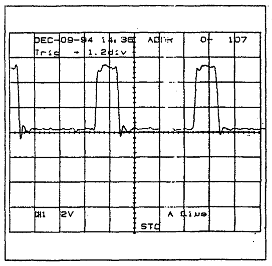

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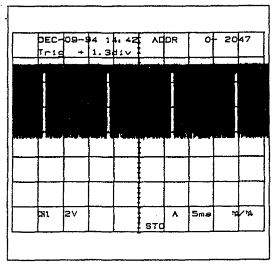

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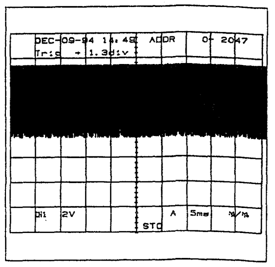

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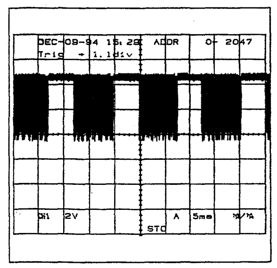

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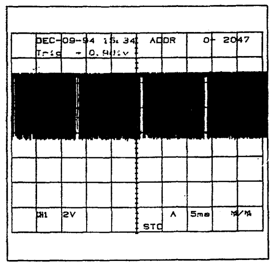
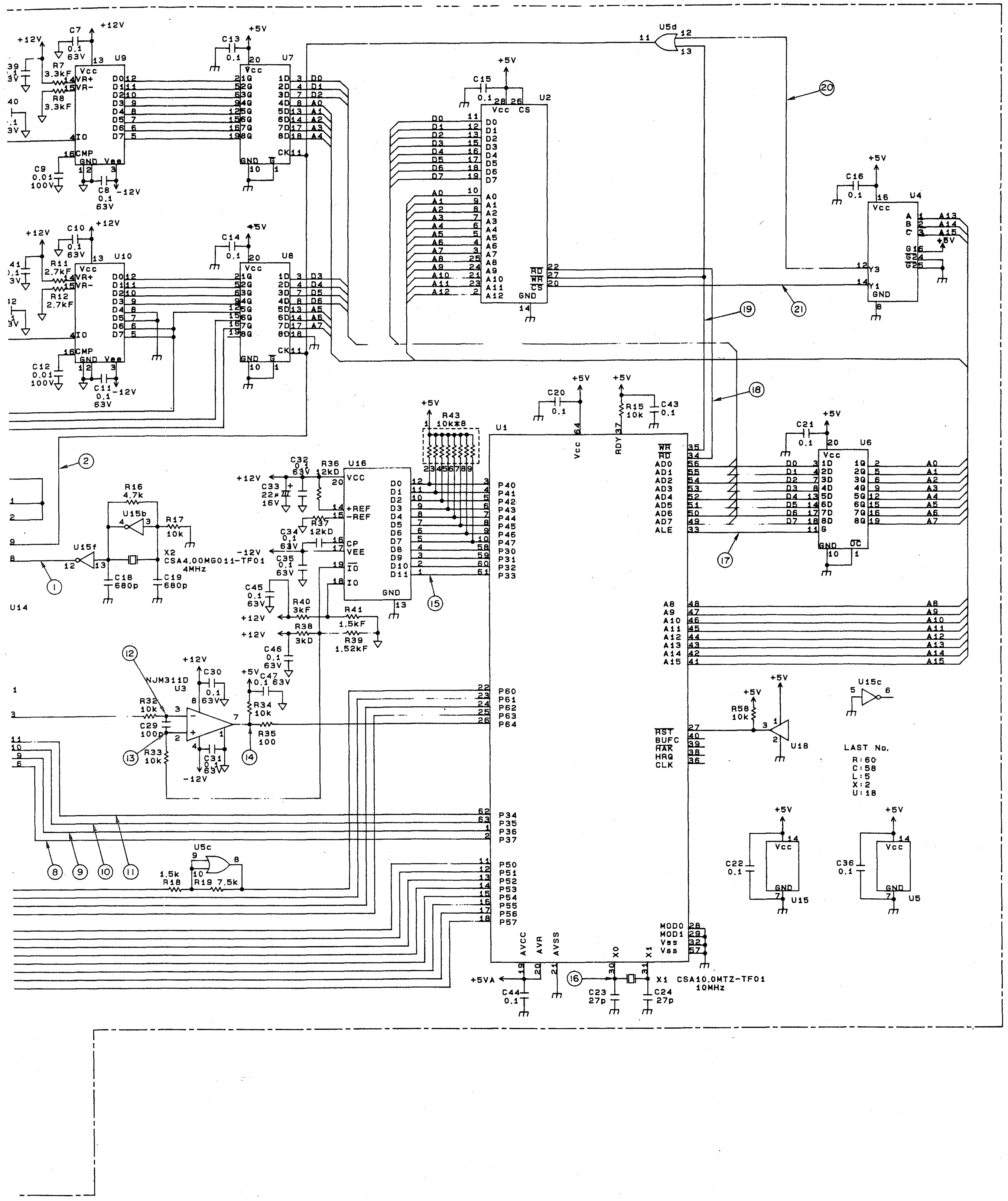


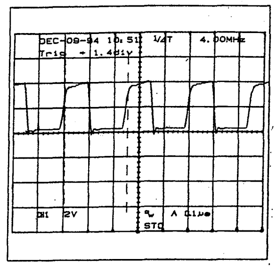
Measuring condition

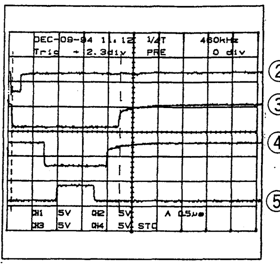
- V-MODE: CH1
- H-MODE: A
- CURSOR MODE: ON
- ΔT, I/ΔT MODE
- ΔCURSOR 10div
- ΔREF CURSOR 0div

CS-5230 SCHEMATIC DIAGRAM


U9
U10
U7
U8
U2
U4
U5d
U1
U6
U16
U15b
U15f
U15c
U5c
U3
U18
U15
U5
U14
NJM311D
X1 CSA10.0MTZ-TF01 10MHz
X2 CSA4.00MG011-TF01 4MHz
R43 10k×8
LAST No.
R:60
C:58
L:5
X:2
U:18
+12V
+5V
-12V
+5VA

①





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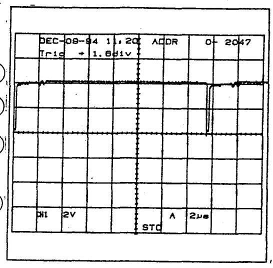

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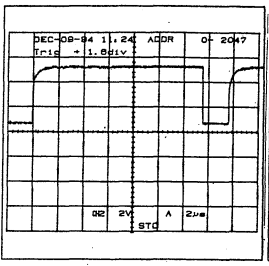

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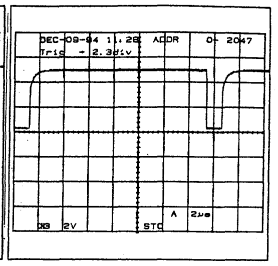

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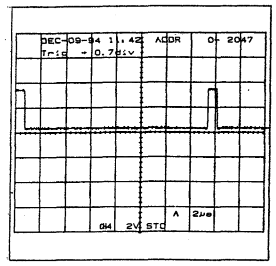

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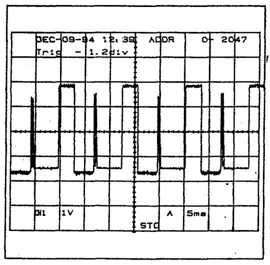

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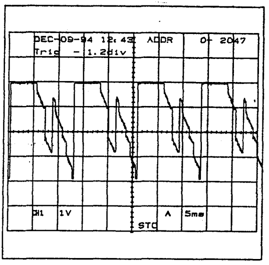

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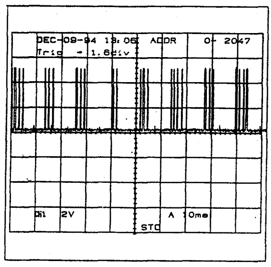

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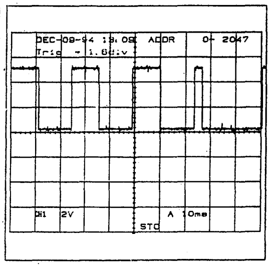

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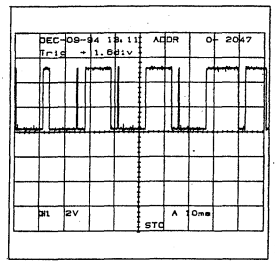

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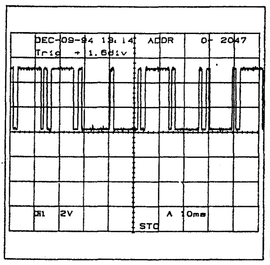

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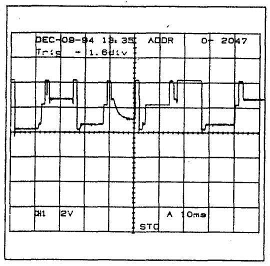

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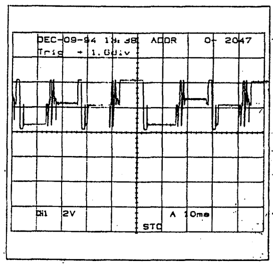

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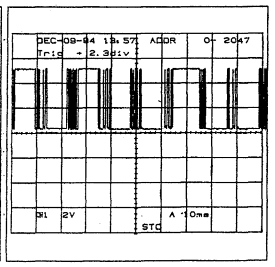

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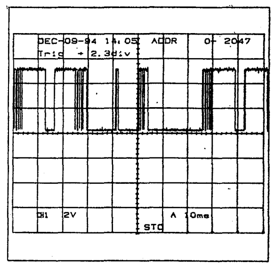

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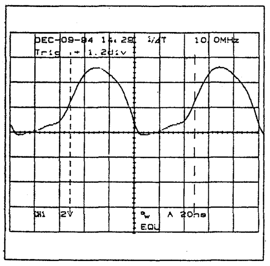

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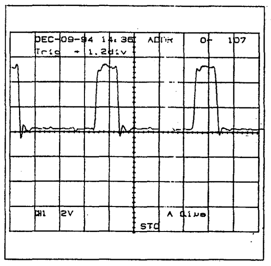

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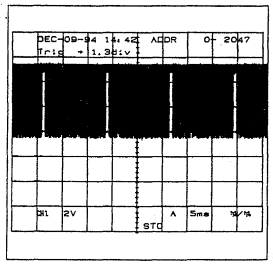

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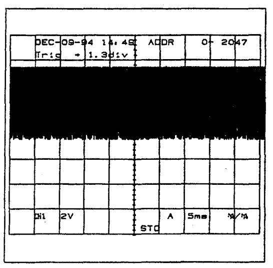

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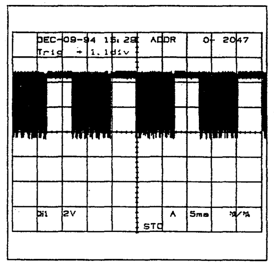

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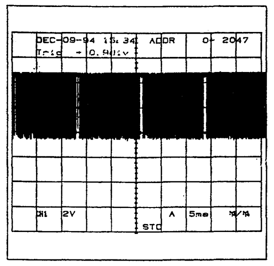


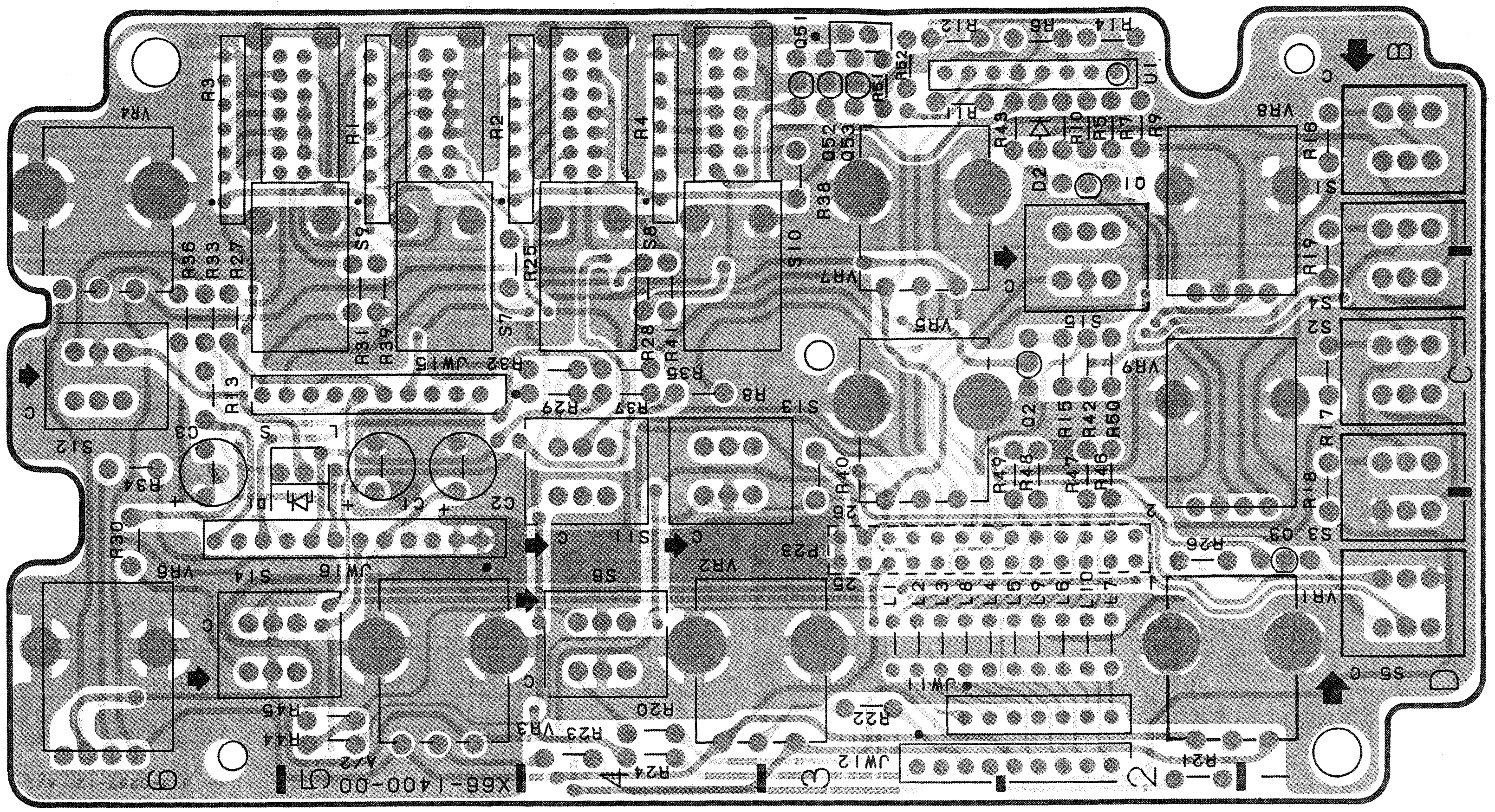
Measuring condition

- V-MODE: CH1
- H-MODE: A
- CURSOR MODE: ON
- ΔT, I/ΔT MODE
- ΔCURSOR 10div
- ΔREF CURSOR 0div

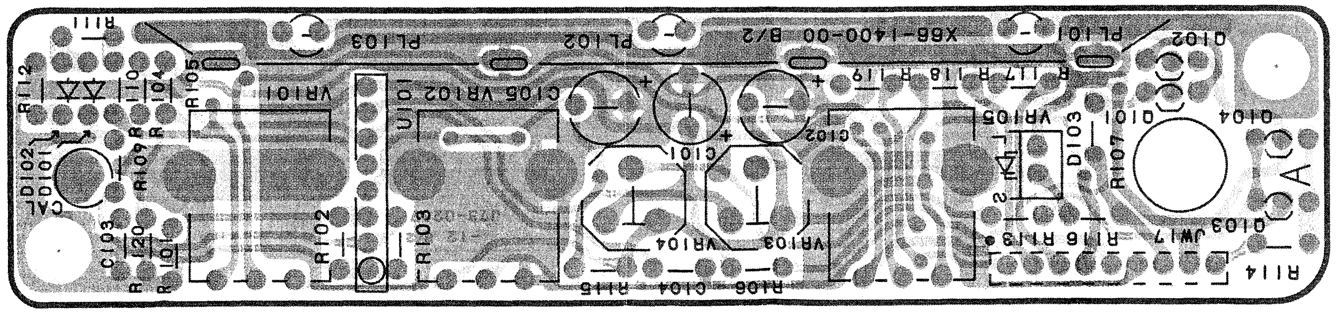
P.C. BOARD

PANEL UNIT (X66-1400-0X)

Pattern side view



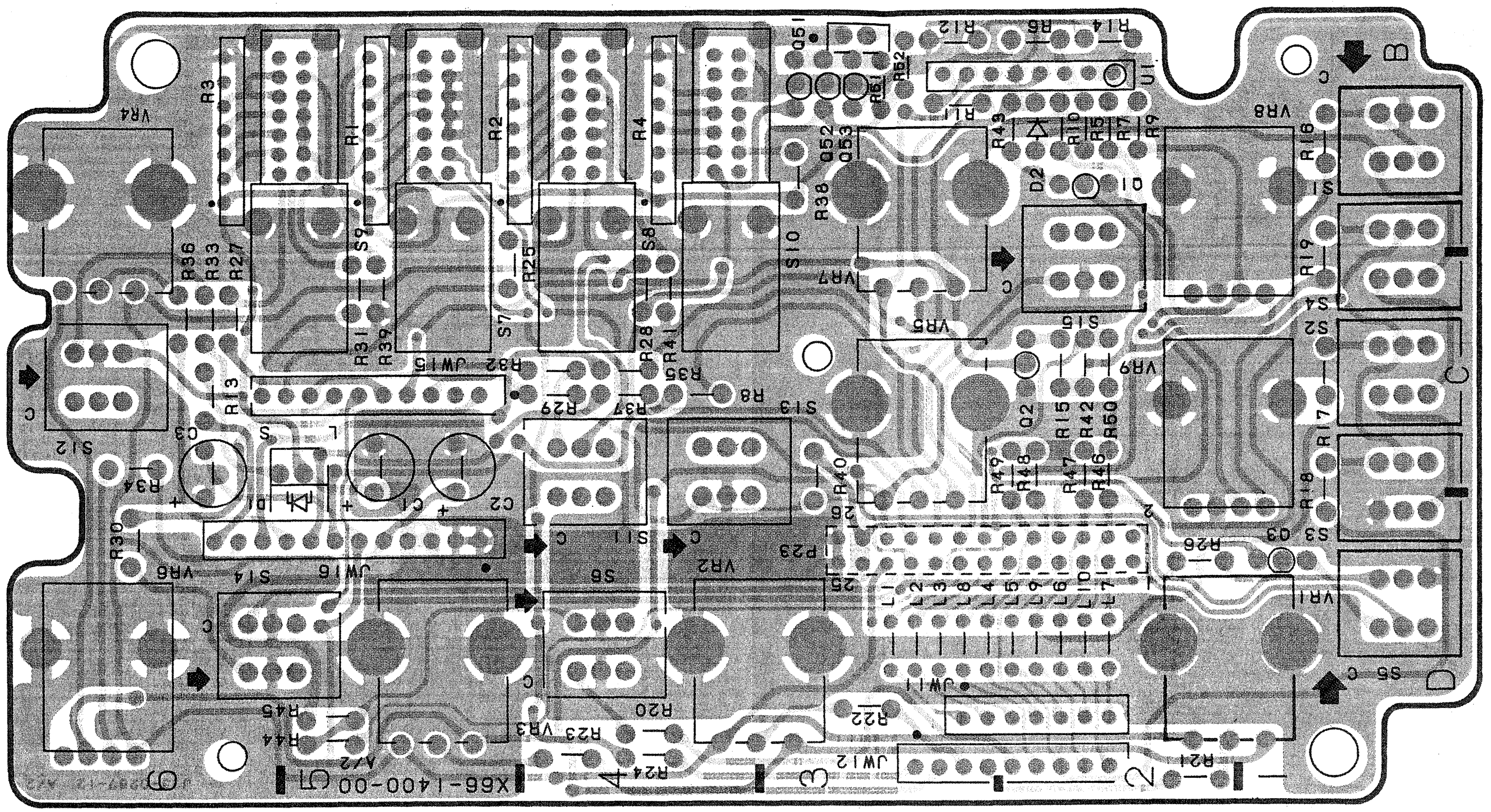
Pattern side view



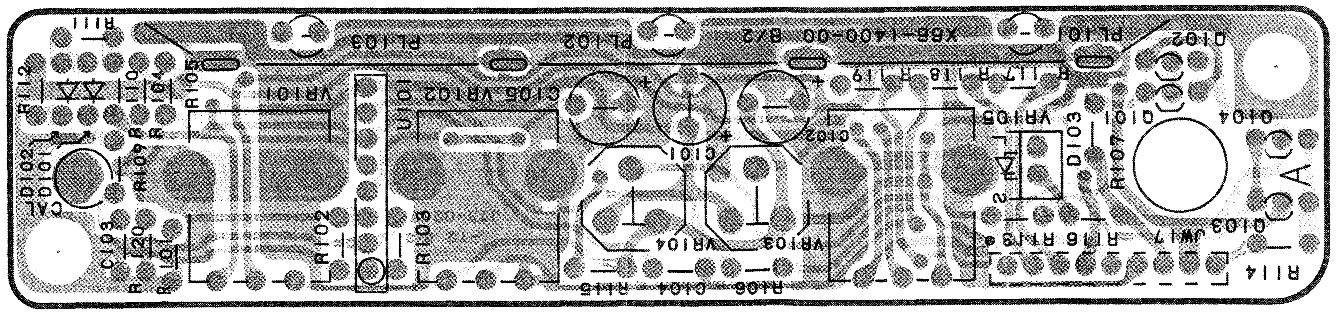
P.C. BOARD

PANEL UNIT (X66-1400-0X)

Pattern side view

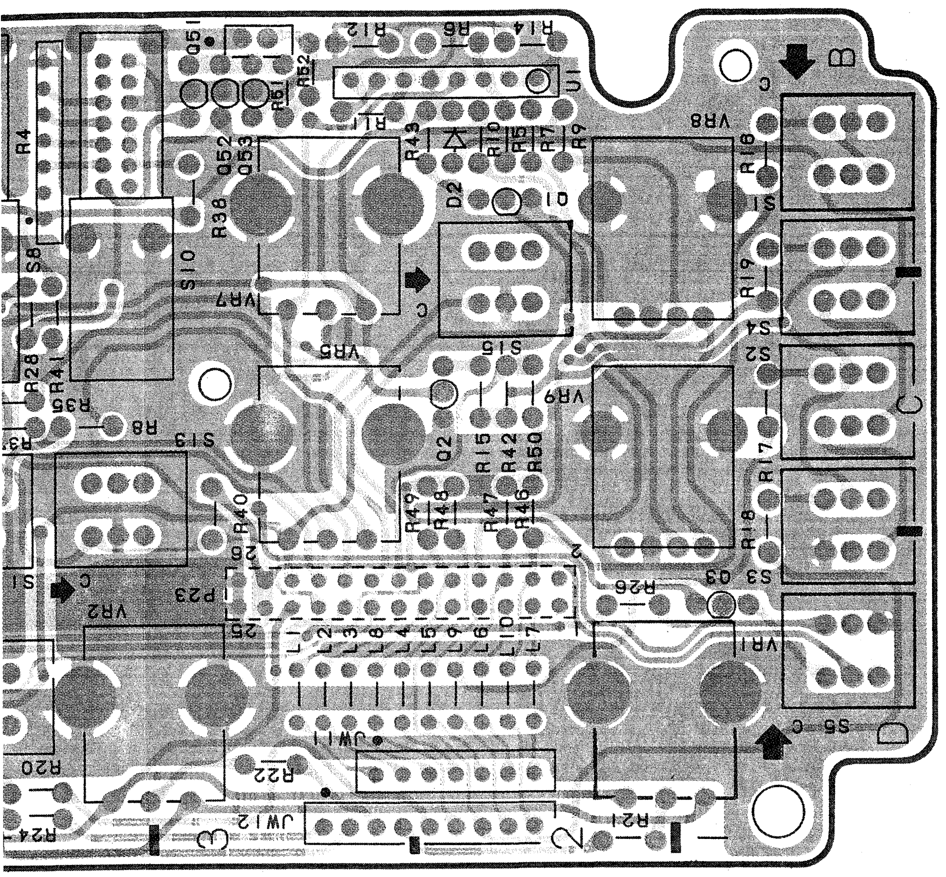


Pattern side view


X66-1400-00 B/2

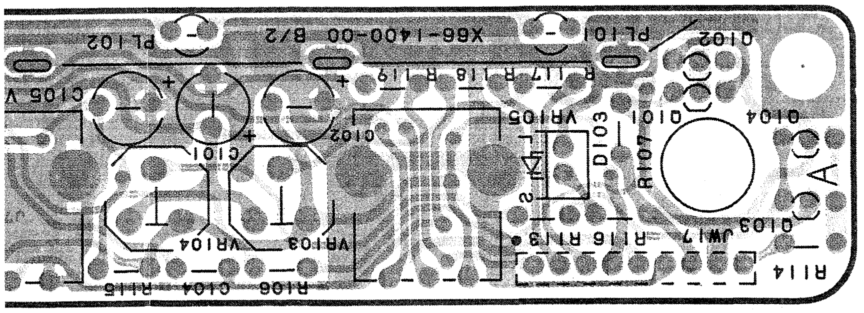
P.C. BOARD

Pattern side view



R4
Q52
Q53
R38
S10
VR7
VR5
R43
D2
R10
Q1
VR8
R16
S1
R19
S4
S2
S15
VR9
Q2
R15
R42
R50
R49
R48
R47
R46
R40
S13
R8
R35
R28
R41
S8
R17
R18
S3
Q3
R26
VR1
S5
VR2
P23
JW11
JW12
R22
R20
R24
R21
B
C
D
2
3

Pattern side view

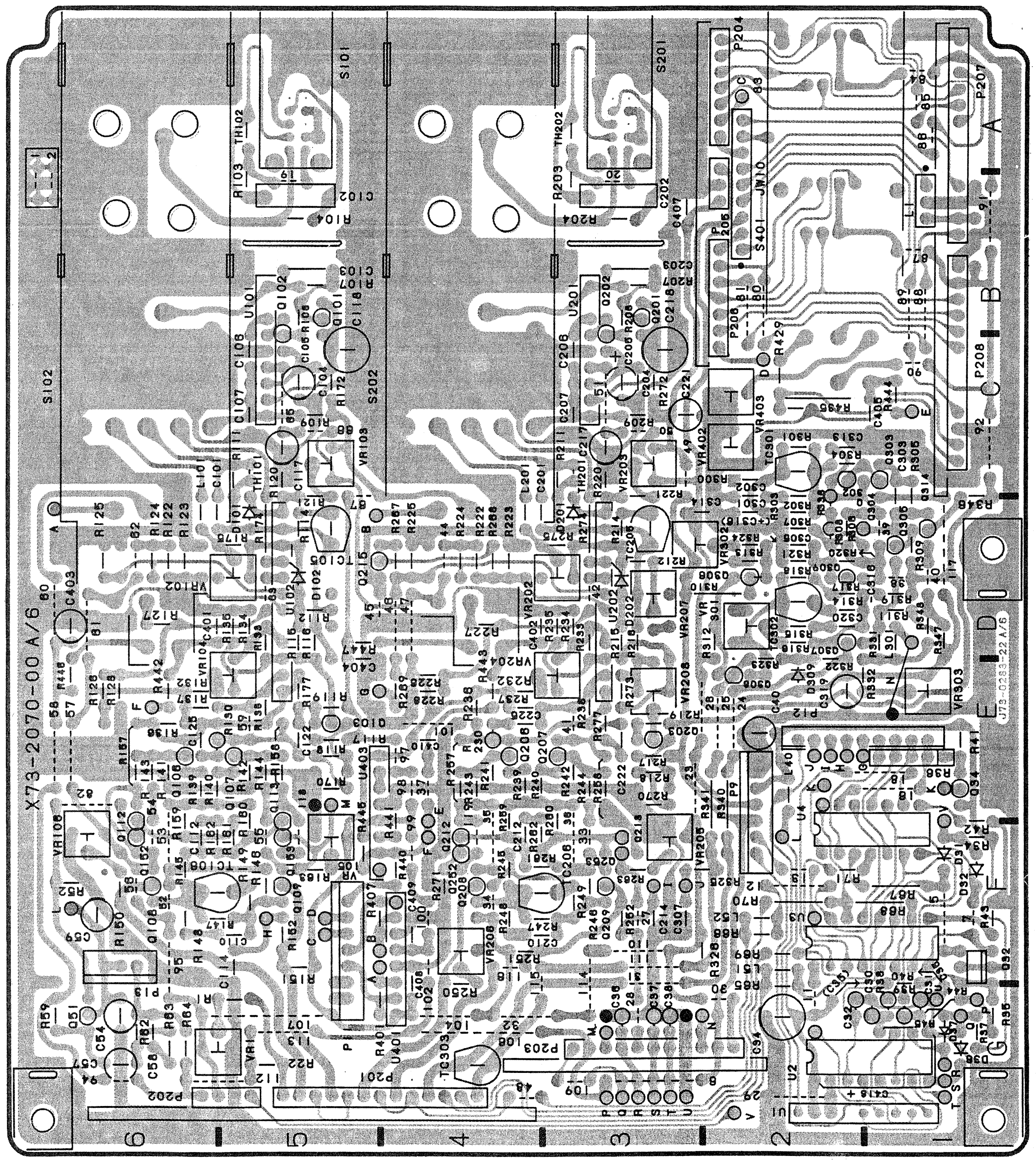


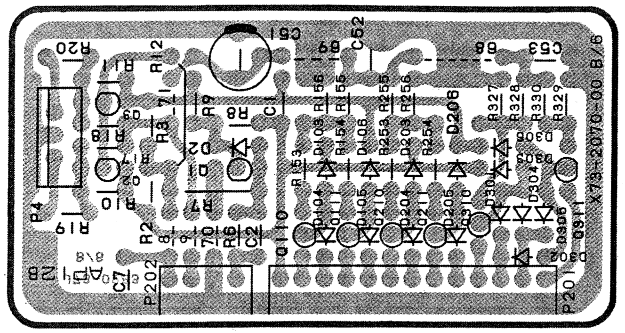
X66-1400-00 B/2
PL101
PL102
Q102
C105
C101
C102
VR105
D103
Q101
Q104
R107
VR104
VR103
JW17
Q103
R116
R113
R114
R106
C104
R115
A

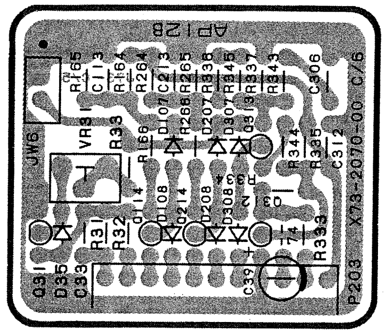
P.C. BOARD

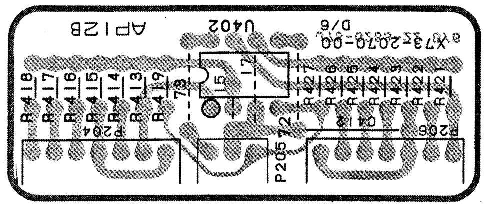
VERTICAL UNIT (X73-2070-0X)

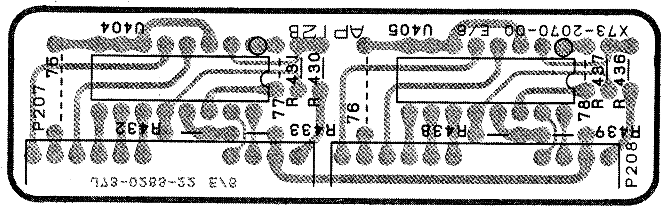
Pattern side view


X73-2070-00 A/6
S101
S102
S201
S202
P204
P207
P208
P202
P201
P203
A
B
C
D
E
F
G
1
2
3
4
5
6

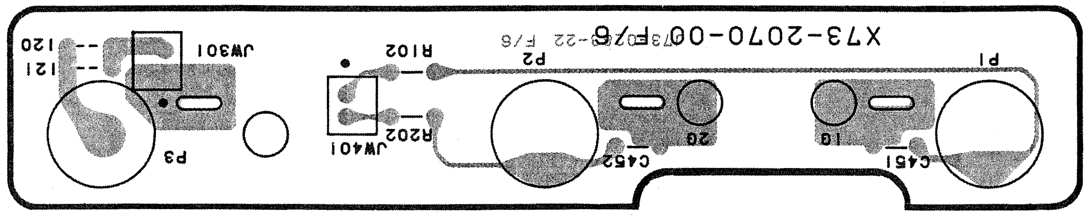

X73-2070-00 B/6


X73-2070-00 C/6


X73-2070-00 D/6


X73-2070-00 E/6

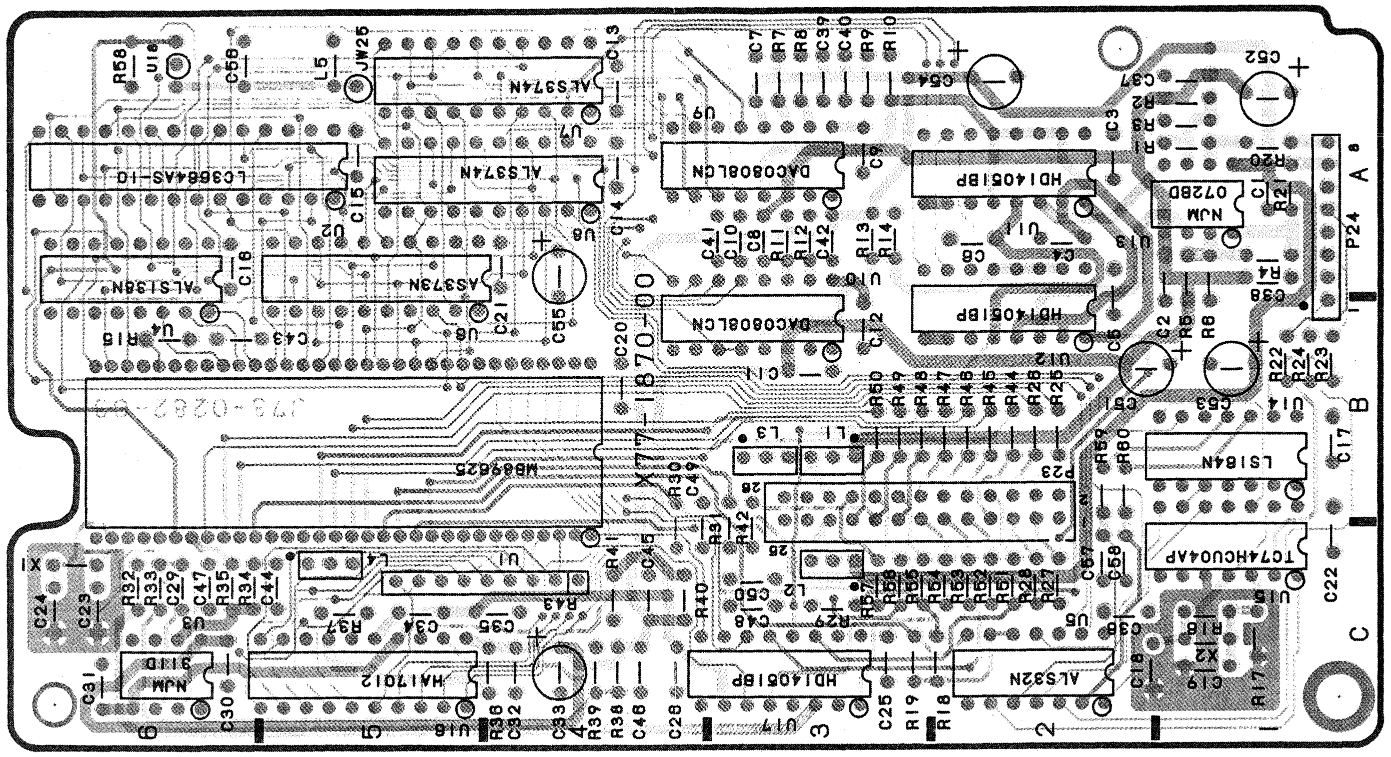
Pattern side view


X73-2070-00 F/6
P1
P2
P3

P.C. BOARD

R/O UNIT (X77-1870-0X)

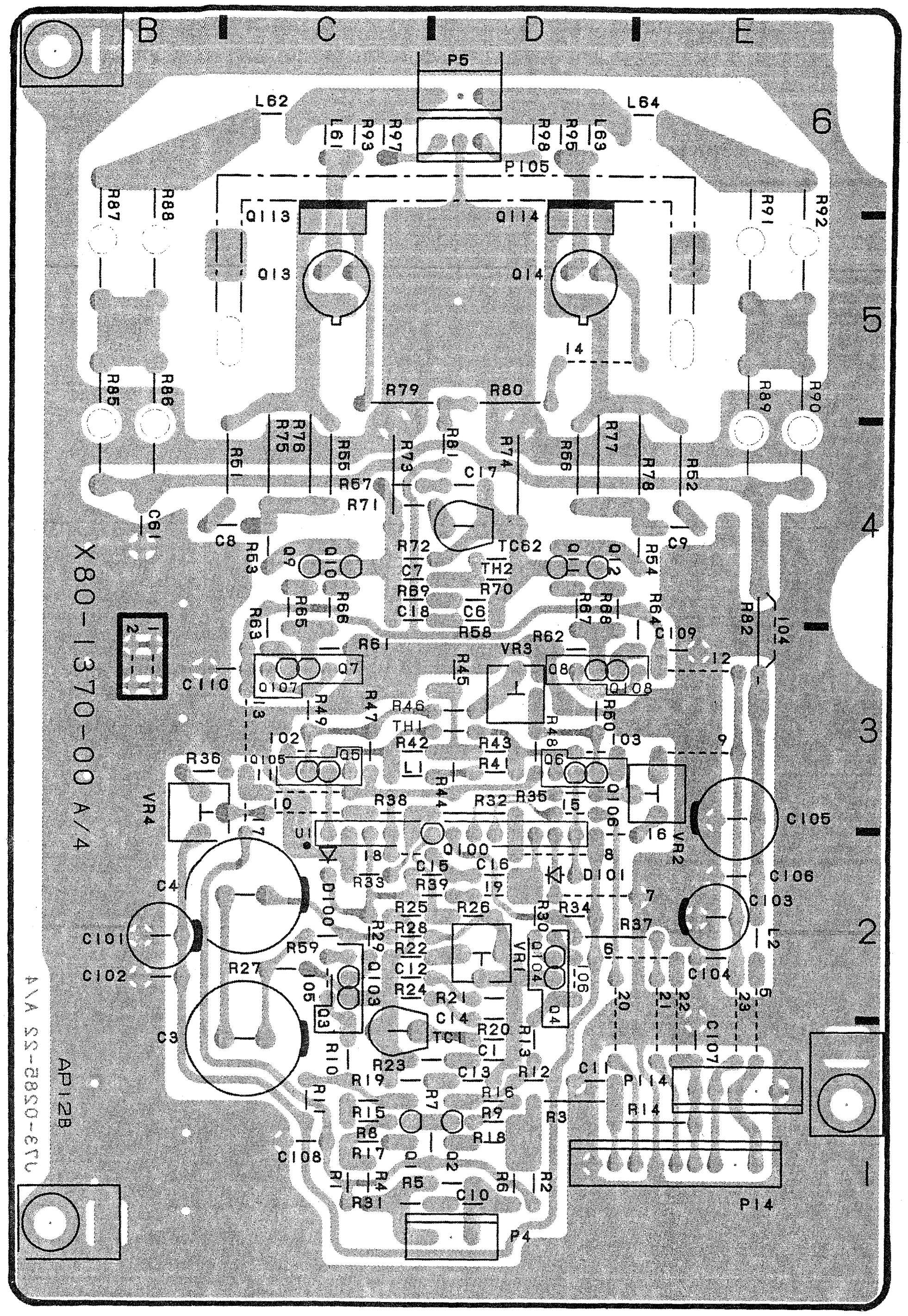
Pattern side view



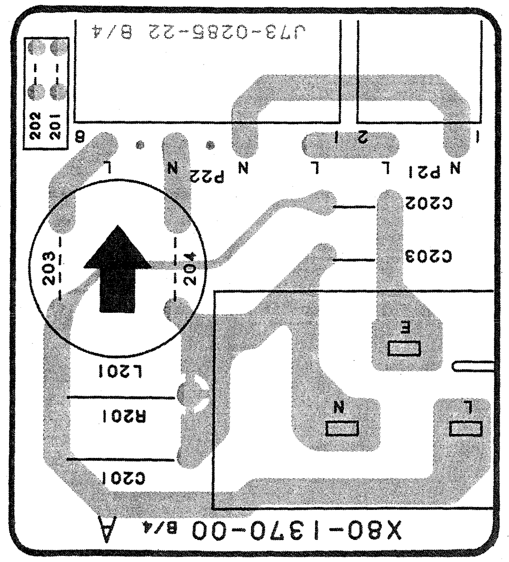
X77-1870-00
P24
A
B
C
1
2
3
4
5
6
R58
L5
JW25
C13
C7
R7
R8
C39
C40
R9
R10
C24
C23
C31
C30
C33
R39
R38
C48
C28
C25
R19
R18
R17
C18
C22
C17
R22
R24
R23
R4
C45
R40
C49
R30
R31
R42
C20
C55
C5
C2
R5
R6

P.C. BOARD

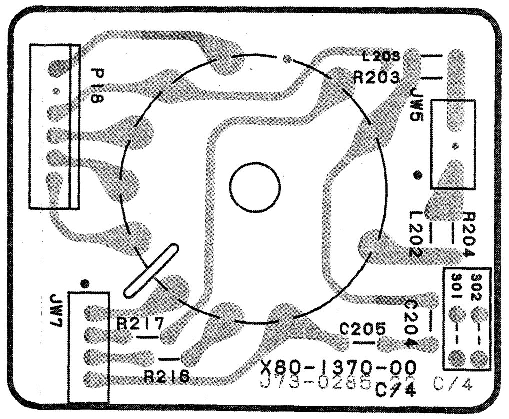
FINAL AMP UNIT (X80-1370-0X)

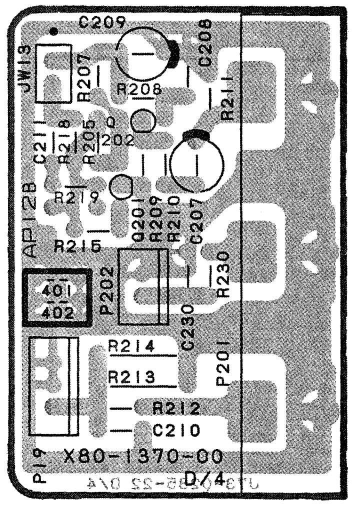

B
C
D
E
6
5
4
3
2
1
P5
P105
L62
L64
Q113
Q114
Q13
Q14
X80-1370-00 A/4
J73-0285-22 A/4
AP12B
C105
C4
C3
C101
C102
VR4
VR2
P14
P114
P4

Pattern side view

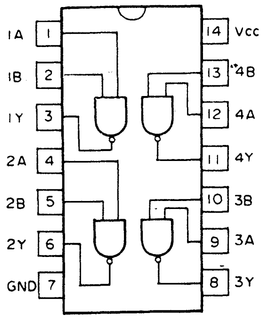

J73-0285-22 B/4
X80-1370-00 B/4
A
P21
P22
C202
C203
L201
R201
C201

Pattern side view

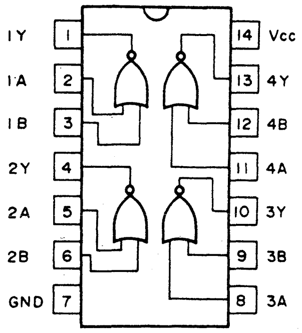

P18
JW5
JW7
L203
R203
L202
R204
R217
R218
C205
C204
X80-1370-00 C/4
J73-0285 C/4


C209
JW13
R207
R208
C208
R211
C211
Q202
Q201
R219
R215
AP12B
P202
R230
C230
R214
R213
R212
C210
P201
P19
X80-1370-00 D/4
J73-0285-22 D/4

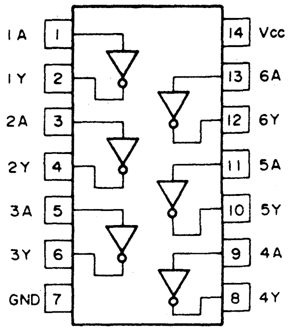
SEMICONDUCTORS


1 1A
2 1B
3 1Y
4 2A
5 2B
6 2Y
7 GND
14 Vcc
13 4B
12 4A
11 4Y
10 3B
9 3A
8 3Y

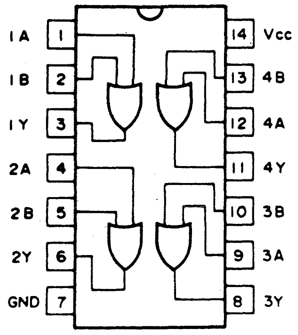
SN74LS00N


1 1Y
2 1A
3 1B
4 2Y
5 2A
6 2B
7 GND
14 Vcc
13 4Y
12 4B
11 4A
10 3Y
9 3B
8 3A

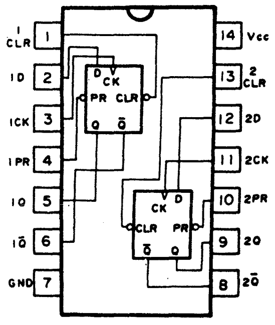
SN74ALS02N


1 1A
2 1Y
3 2A
4 2Y
5 3A
6 3Y
7 GND
14 Vcc
13 6A
12 6Y
11 5A
10 5Y
9 4A
8 4Y

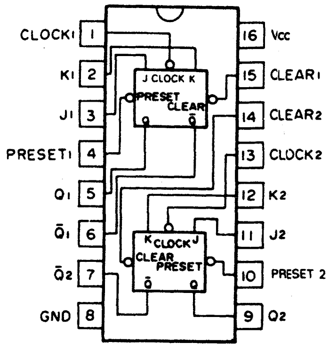
SN74ALS04BN


1 1A
2 1B
3 1Y
4 2A
5 2B
6 2Y
7 GND
14 Vcc
13 4B
12 4A
11 4Y
10 3B
9 3A
8 3Y

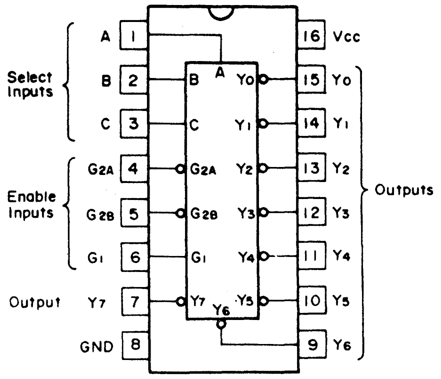
SN74ALS32N


1 1 CLR
2 1D
3 1CK
4 1PR
5 1Q
6 1Q̄
7 GND
14 Vcc
13 2 CLR
12 2D
11 2CK
10 2PR
9 2Q
8 2Q̄
D
CK
PR
CLR
Q
Q̄

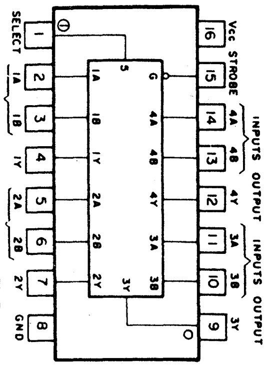
SN74ALS74AN


1 CLOCK1
2 K1
3 J1
4 PRESET1
5 Q1
6 Q̄1
7 Q̄2
8 GND
16 Vcc
15 CLEAR1
14 CLEAR2
13 CLOCK2
12 K2
11 J2
10 PRESET 2
9 Q2
J CLOCK K
PRESET
CLEAR
K CLOCK J
CLEAR
PRESET

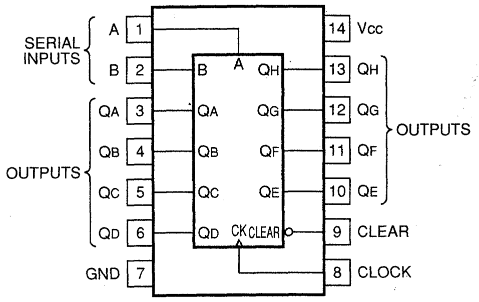
SN74LS112AN


Select Inputs
Enable Inputs
Output
Outputs
1 A
2 B
3 C
4 G2A
5 G2B
6 G1
7 Y7
8 GND
16 Vcc
15 Y0
14 Y1
13 Y2
12 Y3
11 Y4
10 Y5
9 Y6

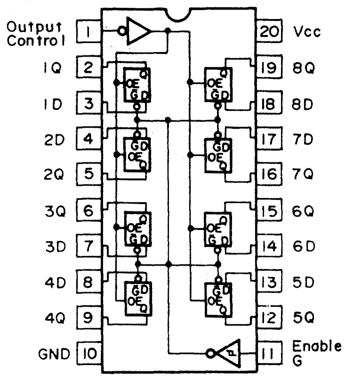
SN74ALS138N


SELECT
INPUTS
OUTPUT
1 SELECT
2 1A
3 1B
4 1Y
5 2A
6 2B
7 2Y
8 GND
16 Vcc
15 STROBE
14 4A
13 4B
12 4Y
11 3A
10 3B
9 3Y

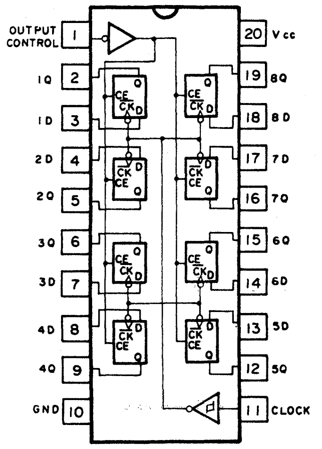
SN74LS158N


SERIAL INPUTS
OUTPUTS
1 A
2 B
3 QA
4 QB
5 QC
6 QD
7 GND
14 Vcc
13 QH
12 QG
11 QF
10 QE
9 CLEAR
8 CLOCK
CK

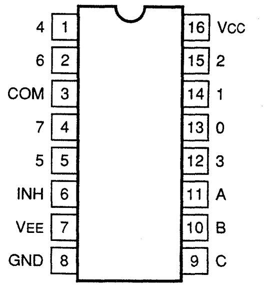
SN74LS164N


1 Output Control
2 1Q
3 1D
4 2D
5 2Q
6 3Q
7 3D
8 4D
9 4Q
10 GND
20 Vcc
19 8Q
18 8D
17 7D
16 7Q
15 6Q
14 6D
13 5D
12 5Q
11 Enable G

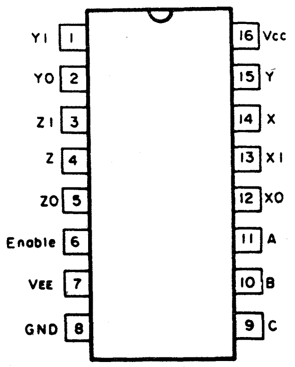
SN74AS373N


1 OUTPUT CONTROL
2 1Q
3 1D
4 2D
5 2Q
6 3Q
7 3D
8 4D
9 4Q
10 GND
20 Vcc
19 8Q
18 8D
17 7D
16 7Q
15 6Q
14 6D
13 5D
12 5Q
11 CLOCK

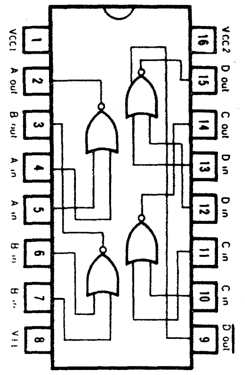
SN74ALS374AN


1 4
2 6
3 COM
4 7
5 5
6 INH
7 VEE
8 GND
16 Vcc
15 2
14 1
13 0
12 3
11 A
10 B
9 C

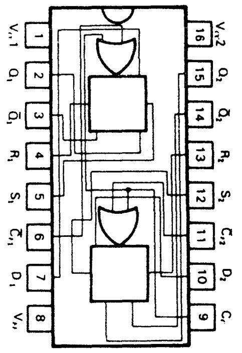
TC74HC4051AP


1 Y1
2 Y0
3 Z1
4 Z
5 Z0
6 Enable
7 VEE
8 GND
16 Vcc
15 Y
14 X
13 X1
12 X0
11 A
10 B
9 C

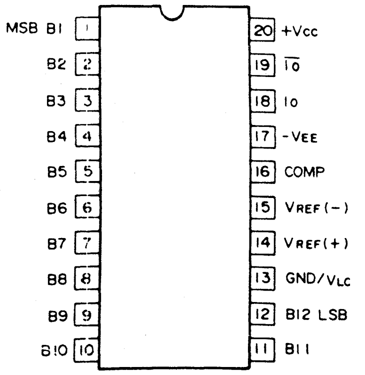
TC74HC4053AP


1 VCC1
2 A out
3 B out
4 A in
5 A in
6 B in
7 B in
8 VEE
16 VCC2
15 D out
14 C out
13 D in
12 D in
11 C in
10 C in
9 D out

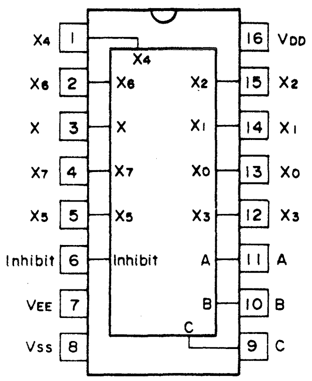
MC10102L
MC10H102L


1 VCC1
2 Q1
3 Q̄1
4 R1
5 S1
6 CE1
7 D1
8 VEE
16 VCC2
15 Q0
14 Q̄0
13 R0
12 S0
11 CE0
10 D0
9 C

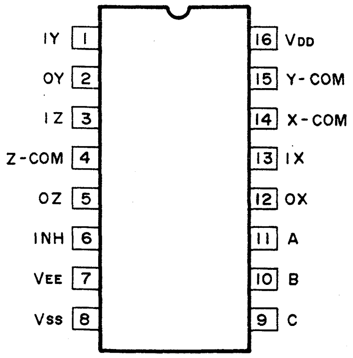
MC10131L
MC10H131L


1 MSB B1
2 B2
3 B3
4 B4
5 B5
6 B6
7 B7
8 B8
9 B9
10 B10
20 +Vcc
19 Ī0
18 I0
17 -VEE
16 COMP
15 VREF(-)
14 VREF(+)
13 GND/VLC
12 B12 LSB
11 B11

HA17012PB

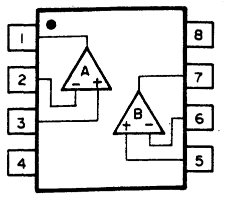

1 X4
2 X6
3 X
4 X7
5 X5
6 Inhibit
7 VEE
8 Vss
16 VDD
15 X2
14 X1
13 X0
12 X3
11 A
10 B
9 C

HD14051BP


1 IY
2 OY
3 IZ
4 Z-COM
5 OZ
6 INH
7 VEE
8 Vss
16 VDD
15 Y-COM
14 X-COM
13 IX
12 OX
11 A
10 B
9 C

TC4053BP

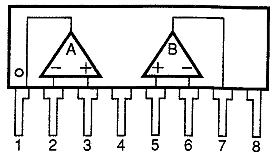
SEMICONDUCTORS



1
2
3
4
8
7
6
5
A
B

Pin name
1. A OUTPUT
2. A (−) INPUT
3. A (+) INPUT
4. V⁻
5. B (+) INPUT
6. B (−) INPUT
7. B OUTPUT
8. V⁺

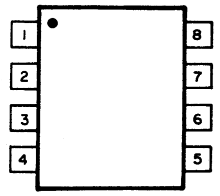
NJM072BD
NJM072D
NJM4558D



A
B
1
2
3
4
5
6
7
8

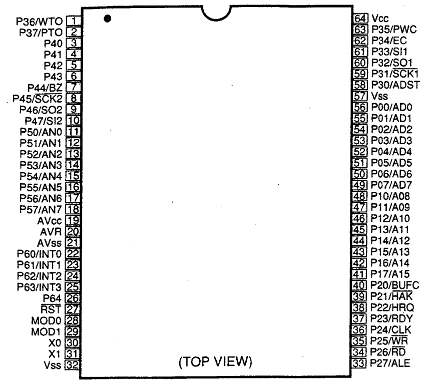
Pin name
1. A OUTPUT
2. A−INPUT
3. A+INPUT
4. V−
5. B+INPUT
6. B−INPUT
7. B OUTPUT
8. V+

NJM072L
NJM4558L



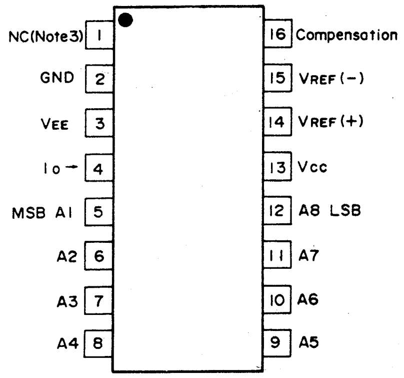
Pin name
1. GROUND
2. + INPUT
3. − INPUT
4. V⁻
5. BAL
6. BAL/STROBE
7. OUTPUT
8. V⁺

NJM311D



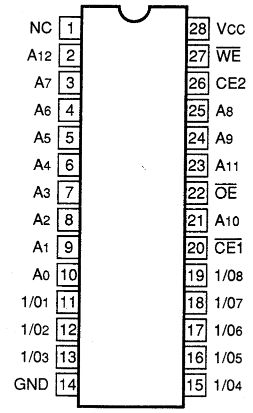
P36/WTO 1
P37/PTO 2
P40 3
P41 4
P42 5
P43 6
P44/BZ 7
P45/$\overline{SCK2}$ 8
P46/SO2 9
P47/SI2 10
P50/AN0 11
P51/AN1 12
P52/AN2 13
P53/AN3 14
P54/AN4 15
P55/AN5 16
P56/AN6 17
P57/AN7 18
AVcc 19
AVR 20
AVss 21
P60/INT0 22
P61/INT1 23
P62/INT2 24
P63/INT3 25
P64 26
$\overline{RST}$ 27
MOD0 28
MOD1 29
X0 30
X1 31
Vss 32
64 Vcc
63 P35/PWC
62 P34/EC
61 P33/SI1
60 P32/SO1
59 P31/$\overline{SCK1}$
58 P30/ADST
57 Vss
56 P00/AD0
55 P01/AD1
54 P02/AD2
53 P03/AD3
52 P04/AD4
51 P05/AD5
50 P06/AD6
49 P07/AD7
48 P10/A08
47 P11/A09
46 P12/A10
45 P13/A11
44 P14/A12
43 P15/A13
42 P16/A14
41 P17/A15
40 P20/$\overline{BUFC}$
39 P21/$\overline{HAK}$
38 P22/HRQ
37 P23/RDY
36 P24/CLK
35 P25/$\overline{WR}$
34 P26/$\overline{RD}$
33 P27/ALE
(TOP VIEW)

CTM5280



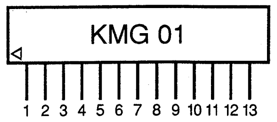
NC(Note3) 1
GND 2
VEE 3
Io− 4
MSB A1 5
A2 6
A3 7
A4 8
16 Compensation
15 VREF (−)
14 VREF (+)
13 Vcc
12 A8 LSB
11 A7
10 A6
9 A5

DAC0808LCN



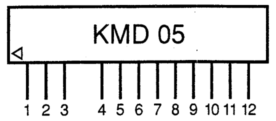
NC 1
A12 2
A7 3
A6 4
A5 5
A4 6
A3 7
A2 8
A1 9
A0 10
1/01 11
1/02 12
1/03 13
GND 14
28 Vcc
27 $\overline{WE}$
26 CE2
25 A8
24 A9
23 A11
22 $\overline{OE}$
21 A10
20 $\overline{CE1}$
19 1/08
18 1/07
17 1/06
16 1/05
15 1/04

LC3664ASL-10



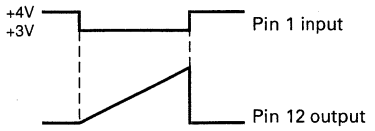
KMG 01
1 2 3 4 5 6 7 8 9 10 11 12 13

1. MIX signal output A
2. GND
3. Signal input A
4. + power supply
5. Bias setting
6. External control
7. R/O character signal input
8. R/O character position input
9. R/O switching signal
10. − power
11. Signal input B
12. GND
13. MIX signal output B

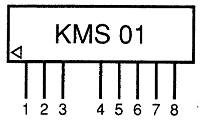


KMD 05
1 2 3 4 5 6 7 8 9 10 11 12

1. Sweep gate input
2. Sweep range input A
3. Sweep range input B
4. Sweep reference voltage input
5. Sweep range input C
6. Offset input
7. − power
8. GND
9. + power
10. External capacitor connection
11. External FET connection
12. Sweep signal output



+4V
+3V
Pin 1 input
Pin 12 output

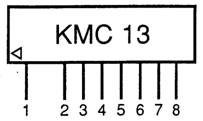


KMS 01
1 2 3 4 5 6 7 8

1. Analog signal input
2. + power
3. GND
4. Digital signal output A
5. Digital signal output B
6. Digital signal output C
7. Digital signal output D
8. Digital signal output E

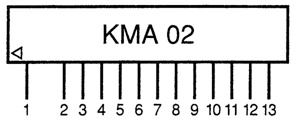
Analog signal input [V]	Output				
	A	B	C	D	E
0.25 ~ 0.45	L	H	H	H	H
0.95 ~ 1.15	H	L	H	H	H
1.65 ~ 1.85	H	H	L	H	H
2.35 ~ 2.55	H	H	H	L	H
3.05 ~ 3.25	H	H	H	H	L

L : 1.0 [V] max
H : 4.5 [V] min



KMC 13
1 2 3 4 5 6 7 8

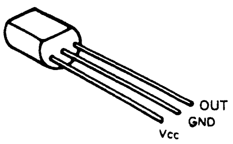
1. Signal input
2. Compensation
3. FET (source) connection
4. GND
5. + power
6. FET (drain) connection
7. − power
8. Signal output



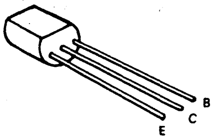
KMA 02
1 2 3 4 5 6 7 8 9 10 11 12 13

1. +140 V output
2. +140 V control
3. +55 V control
4. +55 V output
5. +12 V control
6. +12 V output
7. −12 V control
8. −12 V output
9. +5 V control
10. +5 V output
11. Sweep time reference voltage output
12. External capacitor connection
13. GND

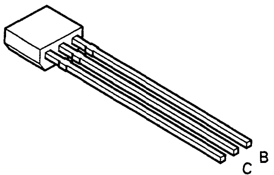
SEMICONDUCTORS



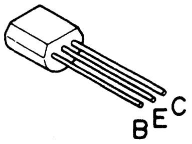
PST518B



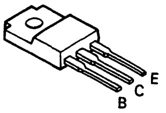
2SA720 (R)
2SA1005 (K)
2SA1208 (S)
2SC1318A (R)
2SC1907
2SC1923 (O)
2SC2551 (O)
2SC2910 (S)



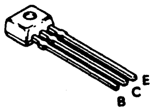
2SA933S
2SC1740S (R,S)



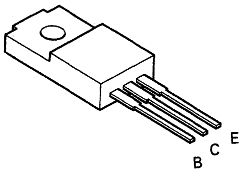
2SA1161
2SC2644
2SC3779 (D)



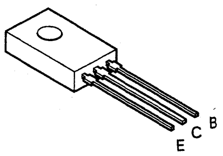
2SA1304
2SB1015 (Y)
2SD1406 (Y)



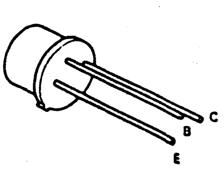
2SA1459 (K)



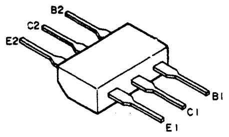
2SA1499 (P)



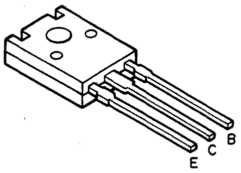
2SA1828 (E)
2SC4732 (E)



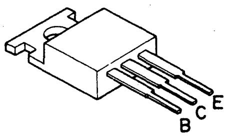
2SC1252


B2
C2
E2
B1
C1
E1

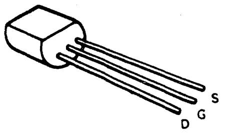
2SC3066 (G)



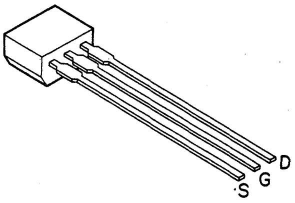
2SC3952 (D)



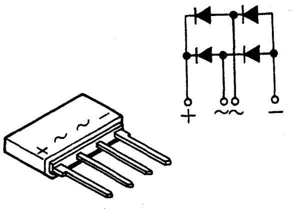
2SD613 (E)



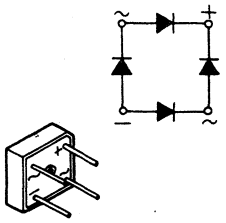
2SK170 (V)



2SK404 (E)



S1VB60



S4VB20F